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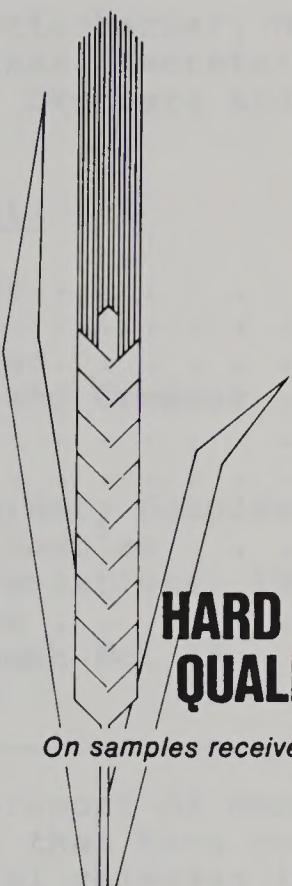
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# **HARD RED SPRING QUALITY REPORT**

*Physical, Chemical, Milling, and Baking Characteristics*

United States Department of Agriculture  
Agricultural Research Service  
North Central Region





## HARD RED SPRING QUALITY REPORT

*On samples received from the 1987 crop*

Source:

Spring and Durum Wheat Quality Laboratory  
USDA, Agricultural Research Service  
Harris Hall, N.D.S.U.  
Fargo, North Dakota 58105



REPORT OF PHYSICAL, CHEMICAL, MILLING AND BAKING  
EXPERIMENTS WITH HARD RED SPRING WHEAT

1987 CROP<sub>1/</sub>

by

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1/ This is a progress report of cooperative investigations containing some results that have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. Cooperators submitting samples for analysis have been given analytical data on their samples prior to release of this report. The report is primarily a tool for use of cooperators and their official staffs and to those persons having direct and special interest in the development of agricultural research programs.

This report was compiled by the Agricultural Research Service, U. S. Department of Agriculture. Special acknowledgment is made to the North Dakota State University for their facilities and services provided in support of these studies. The report is not intended for publication and should not be referred to in literature citations nor quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

2/ Hard Red Spring & Durum Wheat Quality Lab., NDSU.

3/ Dept. of Cereal Science & Food Technology, NDSU.

1987 COOPERATING AGENCIES AND STATIONS

The cooperative agencies and stations conducting the varietal plot and nursery experiments from which the 1987 spring wheat samples were received are listed below:

University of California, Davis

Imperial Valley

Minnesota Agricultural Experiment Station

Crookston, Morris, St. Paul, North area, South area

Montana Agricultural Experiment Station

Bozeman, Sidney, Havre

North Dakota Agricultural Experiment Station

Fargo, Minot, Langdon, Dickinson, Williston, Carrington

South Dakota Agricultural Experiment Station

Redfield, Brookings, Selby

Idaho Agricultural Experiment Station

Aberdeen, Tetonias

Wyoming Agricultural Experiment Station

Sheridan, Powell

Washington Agricultural Experiment Station

Pullman

New York State College of Agric. & Life Sciences-Cornell Univ.

Ithaca

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by R. H. Busch, et al., Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1987.4/

4/ Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1987. Agricultural Research Service, U. S. Department of Agriculture, St. Paul, MN.

4/ Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1987. Agricultural Research Service, U. S. Department of Agriculture, St. Paul, MN.

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- 4/ Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1987. Agricultural Research Service, U. S. Department of Agriculture and State Agricultural Experiment Station, St. Paul, MN.

## INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments in the spring wheat region of the United States<sup>4/</sup> are milled each year by the USDA. The flours are assayed chemically and physically and baked into bread to determine the quality characteristics. The purpose of this report is to make available to the cooperators and other interested parties, quality data on the standard varieties and new strains of hard red spring wheat from the 1987 crop.

The same general format and techniques were used in evaluating the wheat as outlined in quality reports for previous years. The same computer scoring system has been used for the past several years, hence some faulting values differ slightly from previous years. In general, data contained in this report are comparable to data in past reports and, where applicable, average results and also the average results of other crop years are compared. The area averages are tabulated for the Uniform Regional Nursery varieties of Butte, Era, Chris and Stoa. A five-year average (5-YA) and the averages for the individual five years include all selections grown in the Uniform Regional Nurseries for that year. These results give an overview of individual years and the influence of environment on the crop. The actual crop characteristics may be somewhat different due to differences in varieties, but the change from year to year is applicable.

The evaluation of a sample involves three areas of analysis: kernel characteristics, milling performance and baking evaluation. A brief description of the methods is given on pages 9 to 11 of this report. It is possible to deduce the various characteristics of the selection and any outstanding features or deficiencies which are apparent. No specific comments are made regarding the mixogram patterns, since reference mixograms for each of the general types are presented at the end of the report.

Seeding was in full swing the week of April 13. Dry and windy weather made conditions too dry to plant. Small grain seeding was completed by the week of May 24.

The average flour extraction was 0.3% lower than the 1986 crop and 0.5% lower than the 5-year average.

Wheat mineral content was 0.15% lower than the 1986 crop and 0.08% lower than the 5-year average. The wheat protein content was 0.5% higher for both the 1986 crop and the 5-year average. Bake absorption was 1.6% higher than the 1986 crop and 2.9% higher than the 5-year average. Mix time was 1/4 minute longer than the 1986 crop but equal to the 5-year average. The loaf volume for both the 1986 crop and the 5-year average was a little higher than the 1987 crop.

#### SOURCE OF THE 1987 CROP SAMPLES

Tests were performed on 1,503 samples. However, data on 779 of these are not included in this report, because this information was of interest to plant breeders at specific experiment stations only. Data presented in this report are from the Field Plot Nursery and the Uniform Regional Nursery. The samples came from 22 stations in 9 states shown below:

California: Imperial Valley  
Idaho: Aberdeen and Teton  
Minnesota: Crookston, Morris and St. Paul  
Montana: Bozeman, Sidney and Havre  
New York: Ithaca  
North Dakota: Fargo, Minot, Langdon, Dickinson,  
                 Williston and Carrington  
South Dakota: Redfield, Brookings and Selby  
Washington: Pullman  
Wyoming: Sheridan and Powell

On page 8 are listed the spring wheats that were included in the Uniform Regional Nursery trials. The variety or cross, the station that developed the variety, the state selection number or the C.I. number are also given.

#### BLENDING AND AVERAGING PROCEDURES USED

Due to the large number of samples from the Western area this year, this area was divided into two areas - Western and Midwestern. Each of the four areas have 5 stations each. This made a more equal blend for each area. Individual wheat samples from the Uniform Regional Nursery originating from the four geographical areas shown in the illustration on page 7 were blended according to area. All but two of the 22 stations were compatible for blending. (The results from those two stations are included as individual data.) Milling performance, mixograms and baking data were obtained from these area blends. However, data for kernel characteristics are arithmetical averages of individual sample analyses. These data from the Uniform Regional Nursery also are compared with averages from the previous four years. This year there will be two computer printouts. One will show the area and crop-year averages for the four areas, and one will show the area and crop-year averages for the three areas with the Midwestern area included with the Western area averages, Tables 1 and 2.



Wheat blends were made according to the geographical areas shown above.

Data for the Field Plot Nursery are on the individual samples.

THE UNIFORM REGIONAL HARD RED SPRING WHEAT PERFORMANCE NURSERY

The 34 entries in the 1987 URHRSWPN are listed below:

Entry No.	Cross or Variety	CI No. or Selection No.	Year Entered	Source
1.	Marquis	3561	1929	Canada
2.	Chris	13751	1969	USDA-MN
3.	Stoa	ND582	1987	ND
4.	Era**	13986	1972	USDA-MN
5.	Butte 86	ND597	1986	ND
6.	Butte*2/MN7125	SD2980	1986	SD
7.	SD2922/ND581	SD2999**	1987	SD
8.	ND572/SD8025	SD3000	1987	SD
9.	Butte*2/6510-8-101//SD8010	SD3005	1987	SD
10.	ND585/SD8026	SD8052	1987	SD
11.	MN7528/Butte	MN82047**	1985	USDA-MN
12.	MN72299/MN74115	MN81110**	1986	USDA-MN
13.	ND560/MN7595	MN82354**	1986	USDA-MN
14.	MN81110/MN7533	MN84662**	1986	USDA-MN
15.	MN7357/Marshall	MN84056**	1987	USDA-MN
16.		MT8336	1987	MT
17.		MT8446**	1987	MT
18.	SU-1*2/3/Lew//Tioga*2/RL6043	ND606	1985	ND
19.	Len/Coteau 'S'//Era	ND618**	1986	ND
20.	Len/Butte*2/ND507/3/ND593	ND626**	1986	ND
21.	Waldron*2/S6579//SU28-1/Agent	ND622	1986	ND
22.	RL4352-1/Butte	ND640	1987	ND
23.	MN7357/Marshall	HS84-700**	1986	NAPB
24.	MN7357/Len	HS84-873**	1986	NAPB
25.	MN74103/MN72149//MN70121/Olaf	HS84-41**	1987	NAPB
26.	MN7357/Marshall	HS84-692**	1987	NAPB
27.		2385**	1987	Pioneer
28.		W2501**	1987	B.Ag.Res.
29.		FA984-384	1987	WPB
30.		RH HYBD	1987	Rohm Haas
31.		RH LINE	1987	Rohm Haas
32.		RH LINE	1987	Rohm Haas
33.	NHS07664/[(SQ) SELKIRK NDM00004]83007	WA7328**	1987	WA
34.	NHS07664/[(SQ) SELKIRK NDM00004]83007	WA7329**	1986	WA

\*\* Semidwarf

## METHODS

The terminology and methods used are briefly described below:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry, scoured wheat. To determine the dockage-free test weight on a comparable sample, approximately one pound per bushel should be subtracted from the value given.

1000 Kernel Weight - The 1000 kernel weight was determined by counting with a Seeburo seed counter the number of kernels in a 10 g sample of cleaned, picked wheat<sup>5/</sup>.

Kernel Size - The percentages of the size of the kernels (large, medium and small) were determined on a wheat sizer as described by Shuey<sup>6/</sup>.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm opening  
Middle Sieve - Tyler #9 with 2.24 mm opening  
Bottom Sieve - Tyler #12 with 1.65 mm opening

Potential Milling Yield - The potential yield is not shown on the computer tables, but it can be determined by multiplying the percentages of the overs of each sieve #7, #9 and #12 by the value of 78%, 73% and 68%, respectively. The accumulation percentage would be the potential yield.

Milling - The samples were cleaned by passing the wheat over an Emerson kicker and dockage tester and through a modified Forster scourer (Model 6). The clean, dry samples were pretempered to 12% moisture for at least 72 hours; then tempered to 16% moisture and allowed to stand overnight prior to milling.

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5/ Mention of a trademark name or a proprietary product does not constitute a guarantee or warranty of the product by the U. S. Department of Agriculture, and does not imply its approval to the exclusion of other products that may also be suitable.

6/ Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72,75 (1960).

The Special Uniform Nursery Spring Wheat samples were milled on a Brabender Quadrumat Jr. mill. The mill was equipped with a #18 wire on the drum sieve. The throughs of the #18 wire were rebolted on a Strand sifter equipped with a #60 Tyler sieve. The sample was sifted for 1 minute. The throughs of the #60 wire classified as flour, and this was the material tested. The overs of the #18 wire were classified as bran, and the overs of the #60 Tyler sieve as crude shorts.

The Uniform Regional Nursery blends and the Field Plot Nursery samples were milled on a Buhler continuous experimental mill. This mill has been slightly modified to give results more comparable to commercial milling. The break scalping sieves were clothed with #54 stainless steel wire, the reduction scalping sieves with #58, #66 and #105 stainless steel wire for the first, second and third reduction, respectively. All of the flour sieves were clothed with #135 stainless steel wire.

All six flour streams were combined to give the patent flour. The extraction of a good milling wheat using this flow is approximately 68%. This is comparable to a commercial "long patent" extraction flour. At this flour extraction of the wheat, the changes in flour ash are most sensitive to changes in percent extraction.

#### Hardness Test

Wheat hardness scores are reported on the samples. The procedure used requires grinding the wheat samples with a Udv grinder and obtaining data from a Technicon 400 near infrared analyzer. Wavelengths used were 1680 nm and 2230 nm. This procedure was developed by Mr. Karl Norris, USDA, Beltsville through a co-operative research project in which this Laboratory also participated. This procedure is not official and may be replaced with another in the future. Hard red spring wheats generally have scores between 60 and 85.

Protein Content - Both the Kjeldahl procedure and the near infrared technique were used to determine protein content. Nitrogen values, as determined by the Kjeldahl procedure, were multiplied by 5.7 to calculate protein values.

Mineral Content or Ash Content - This was determined by measuring the residue of the minerals left after incinerating the sample for approximately 16 hours at 565°C. The results were reported as percentage of the sample weight.

Mixogram - The mixogram was determined by using 30 g of flour and adding 20 cc of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Absorptions reported were adjusted according to the height of the mixogram. The correction factor was determined from a series of flours by varying the amount of absorption.

Mixogram Pattern - The reference mixogram patterns given at the end of the report demonstrate the different types of mixograms that were obtained. A single number is assigned each pattern to characterize and simplify the classification of the curves--the larger number indicating stronger curve characteristics.

Baking Procedure or Formula - The baking formula used was as follows:

100% flour	3% milk D.S.M.
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted)

The samples were mixed to development in National Manufacturing mixers: the micro mixer for the 25 g samples and the 100 g special mixer for the 100 g samples. Bromate (5 ppm) for oxidation and barley malt flour (0.096%) for enzymatic supplement were added to each sample. All doughs were moulded in a Roll-Er-Up moulder.

Absorption - The amount of water, expressed as percent of the flour, required to bring the dough to proper consistency.

Crumb Color - A value was determined by comparing the loaf of the tested sample against a baking standard. This standard was an equal blend of the variety Len grown at Casselton and Minot, ND, Redfield, SD, Crookston, MN and Sidney, MT.

Loaf Volume - The volume of the baked loaf as determined by seed displacement.

All values (protein, ash and absorption) were reported on a 14% moisture basis.

## DISCUSSION

The following discussion presents some of the basic techniques and criteria used in the milling and baking quality evaluation of the samples. There are three major evaluation categories used: kernel characteristics, to characterize the kernel; milling performance, to evaluate the general milling characteristics; baking score, to evaluate the flour as to type and overall baking quality.

Each evaluation category can be important. A sample could be of a sufficiently poor quality for a given category to suggest elimination from future testing. However, a sample submitted for the first time and found to be questionable should be tested again to establish if it has a satisfactory or unsatisfactory classification. A sample which is consistently rated as questionable should be discarded.

Five characteristics (test weight, 1000 kernel weight, percent small kernels, wheat mineral and wheat protein) were independent variables used to calculate the dependent variable - wheat score. Four characteristics (percent extraction, mineral @ 65% extraction, flour protein and milling character) were used to calculate the dependent variable - mill score. Seven characteristics (mixogram pattern, bake absorption, mixing time, dough characteristics, crumb color, crumb grain and loaf volume) were used to calculate the dependent variable - bake score. These three dependent variables after calculation become independent variables used to calculate the dependent variable - general evaluation.

This is the sixth year our current computer program has been used, which was designed and implemented to handle the analysis and tabulation for the data from each station. This program uses the Statistical Analysis Systems (SAS Institute, Inc., SAS Circle, Box 8000, Cary, NC 27511).<sup>7/</sup>

The samples are tested and data collected on 17 quality factors or variables. The program then grades each factor against predetermined faulting values and assigns major (MJ) or minor (MI) faults where applicable. The data is then broken down into 3 major areas of concern to relate more directly to agronomic, industrial and consumer requirements. Each sample is assigned a score of 4 in the areas of Wheat Characteristics, Milling Characteristics and Baking Characteristics. The program then adjusts the score (4 = Good promise, 3 = Some promise, 2 = Little promise, 1 = No promise) depending upon the number of major and/or minor faults assigned to that sample.

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<sup>7/</sup> Nolte, L.L., Youngs, V.L., Crawford, R.D., and Kunerth, W.H. 1985. Computer program evaluation of hard red spring wheat. Cereal Foods World 30:227-229.

A general score is also given to each sample. This score is again 1-4 and is obtained by calculating the mean of the other 3 scores.

The following tables list the variables used in each scoring area and their specific faulting and scoring values.

#### WHEAT SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Test Weight (#/bu)	57.9	56.9	-	-1
1000 Kernel Weight <sup>a</sup> (g)	Mean-2.1	Mean-5.1	-	-1
Small Kernels (%)	8	16	-	-1
Wheat Mineral (%)	1.71	1.81	-	-
Wheat Protein (%)	13.9	12.9	-1	-2

<sup>a</sup> The mean, or average, is calculated using the data from the standards tested with that station.

#### MILL SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Flour Extraction <sup>a</sup> (%)	Mean-2.1	Mean-4.1	-1	-2
Flr. Mineral @ 65% Ex. <sup>b</sup>				
Large Samples	.47	.51	-	-1
Small Samples	.57	.61	-	-1
Flour Protein (%)	12.9	12.4	-1	-2
Milling Character <sup>c</sup>	3	2	-1	-2

<sup>a</sup> The mean, or average, is calculated using the standards tested with that station.

<sup>b</sup> The large samples are milled on a Buhler experimental mill, and the small samples are milled on a Quadrumat Jr. experimental mill. Different values are used to compensate for the difference in the efficiency of the two mills and their respective procedures.

<sup>c</sup> 5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.

BAKE SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Mixogram Pattern <sup>a</sup>	2,7 or 8	1,or 9-11	-	-1
Bake Absorption (%)	61.9	60.4	-1	-2
Mix Time (min.)	5.75-8.00 or 2.00-2.75	0-1.75 or over 8.00	-1 -1	-2 -2
Dough Characteristic <sup>b</sup>	6,5	4 or less	-	-2
Crumb Color <sup>c</sup>	6-4	3 or less	-	-1
Crumb Grain <sup>d</sup>	7-4	3 or less	-	-1
Loaf Volume <sup>e</sup> (cc)	Lg. Mean-55 Sm. Mean-21		Mean-105 Mean-31	-1 -1 -2 -2

- <sup>a</sup> Refer to reference mixograms for numerical curve pattern.  
(1 = very weak--11 = very strong)
- <sup>b</sup> 9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable.  
6 = Pliable. 5 = Very pliable. 4 = Very elastic.  
3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable.  
0 = Dead.
- <sup>c</sup> The column headed Crumb Color on the data tables has two scores. The first score is the brightness, or sheen, of the grain as compared to the standard(s). (Standard = 100.) The second score is a single digit indicating the color of the interior of the loaf. 9 = Bright white. 8 = White.  
7 = Normal. 6 = Slightly creamy. 5 = Bright creamy.  
4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray.  
0 = Dull.
- <sup>d</sup> The column on the data tables headed Crumb Grain also has two scores. The first score is a numerical comparison against the standard(s). The second score indicates the structure of the grain. 12 = Normal. 11 = Slightly irregular. 10 = Slightly open. 9 = Slightly irregular and open. 8 = Slightly open and irregular. 7 = Irregular.  
6 = Open. 5 = Irregular and slightly open. 4 = Open and slightly irregular. 3 = Irregular and open. 2 = Open and irregular. 1 = Harsh. 0 = Soggy.
- <sup>e</sup> The mean, or average, is calculated using the standards tested with that station. "Lg." refers to the faulting and scoring values for 100 g. loaves. "Sm." refers to the faulting and scoring values for 25 g. (pup) loaves.

All samples, as in previous years, are compared with a milling and baking standard that represents a blend of the crop year blended to a known quality. However, the samples for the individual stations are evaluated against the average results of the check varieties from the respective stations. The agronomic and climatic conditions of the individual locations can affect the quality of the wheat sample, such that the evaluation at certain locations could have all samples--even the named varieties--classified as questionable to unsatisfactory. Therefore, the evaluation ratings of one station are not directly comparable with those of another station. For example, an area may produce low protein wheats which give large and plump kernels, good milling and kernel characteristics, but low protein and unsatisfactory baking properties such as short mixing time, low loaf volume and weak dough characteristics. The wheat from this area could not be considered as a strong spring wheat and would not maintain the quality expected from the spring wheat producing area. A good variety should have tolerance to a wide range of environmental conditions and the overall picture should be taken into consideration for establishing these varieties.

Kernel Characteristics are important in determining the initial value of the wheat and, if extremely poor, could disqualify a new variety from further consideration. Because of the present grading system, it is desirable to have a good test weight. If a sample has a low 1000 kernel weight and small kernel size distribution, it would be considered a poor sample for milling because of the high ratio of bran to endosperm. Therefore, it is desirable to have plump kernels. Wheat ash is an important factor when comparing a variety against other standard varieties. If a sample consistently has higher wheat mineral content, it increases the probability of having high flour ash. Lower protein than the standard varieties is not desirable, because in a low protein crop year the probability of it having such a low protein as to be undesirable is much greater. Therefore, the protein must also be considered as a characteristic when comparing varieties grown in the same locality.

Milling Performance is very important, especially the subcategory of milling characteristics. If low extraction or high flour ash is obtained, these become major factors which are quite unacceptable from a commercial milling standpoint. All flour mineral contents are reported at a constant extraction of 65%, so that the figures are directly comparable. As a rule of thumb, one can approximate that each point of ash (0.01%) is equivalent to approximately 2% in extraction.

Milling characteristics are important. A sample which tends to be soft in character requires a different milling technique to be milled properly. On commercial mills flowed for hard vitreous spring wheats, soft milling characteristics cause great difficulty. Therefore, if a sample shows softness in character, it is considered to be unsatisfactory. Likewise, a sample which is extremely hard and vitreous will cause difficulty. Both types of wheat (soft and vitreous) require different roll pressures, clothing, sifter surface and temper to be milled properly. If these wheats are blended with normal milling wheats, improper results are obtained since these characteristics are not necessarily compatible or additive. Normal to soft score indicates that the sample shows a tendency toward softness of character on the flour mill stocks and extraction. This would indicate that the sample may give some difficulty for certain mill streams, and an adjustment would either have to be made in the milling flow or in tempering procedures to compensate for these differences. The properties of this wheat may or may not be compatible with other wheats with which it may be blended; therefore, it is important to maintain varieties with milling characteristics as uniform as possible.

The amount of protein recovered in the flour for a sample is of importance. High protein wheats yielding low protein flours are not desirable. Such a wheat would have much of the protein distributed in the outer portion of the kernel which would result in excessive protein in the feed. Therefore, higher wheat protein would be necessary to yield a flour with protein content comparable to that of a wheat that gives good flour protein recovery.

Mixogram Patterns and Farinogram Patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. A long, flat curve is more desirable than a short, peaked curve; however, an extremely long curve may be undesirable, if the flour would require excessive mixing for proper development. Both the pattern and length of the curve are important, and both must be considered. Abnormal curves, such as sway-back or long initial time to incorporate the water, indicate undesirable characteristics.

Baking Evaluation takes into account the flour absorption, mixing time, dough characteristics, loaf volume and machinability. A sample which has low absorption would be unsatisfactory. A sample with extremely short mixing time would also be considered undesirable as a good strong spring wheat. When a sample is in the minimal range for these values, it is considered to be questionable until further testing demonstrates whether a definite deficiency exists.

Doughs having mellow to weak dough properties show a tendency towards weakness. Also, for mellow to strong, the dough is mellow but has a tendency to be strong, and a strong to mellow dough is just the reverse. Since these characteristics are subjective rather than objective, it is necessary at times to estimate the tendency; therefore, the necessity exists for apparent double grades.

The grain or appearance of the interior of the loaf shows how well the sample stood up during baking and may point out or explain some deficiencies which have been observed during the baking test.

Loaf volume indicates potential strength of the flour in a different manner than mixing time or dough characteristics in that it shows the ability or lack thereof for the dough to expand under pressure and to contain the entrapped gases during this expansion. Weak flours act much like balloons, which burst when blown up and collapse and yield low loaf volume or yield an extremely large volume with large holes in the interior of the loaf. Low protein flours and lifeless (dead) doughs exhibit properties similar to putty and do not expand during fermentation or baking and give low loaf volume. Tough and very bucky doughs are bound too tightly and impede expansion of the gases causing low loaf volume.

General Evaluation rating applies only to the data contained in the year of the report. However, a summation of total and major deficiencies, and an average General Evaluation score for the number of years the sample has been tested are included in the discussion of individual varieties and selections of the Uniform Regional Nursery.

UNIFORM REGIONAL NURSERY SAMPLES - 1987 CROP

Discussion of Area Blends

A total of 681 Uniform Regional Nursery samples were received from 20 stations in 7 states. However, only 614 wheat samples were blended for this crop year by area. The areas tend to represent movement of the wheat in the market (See map, page 7). Kernel characteristics were determined on individual samples to eliminate possible erroneous results. The area blends were then milled and baked by our macro method. Thirty-four samples were received from each of the 20 stations. Twenty-nine selections were included for quality evaluation in the Uniform Regional Nursery samples. The remainder of the samples were the commercially named varieties Butte, Chris, Era, Marquis and Stoa.

Data from the southeast area blend are given in Table 3. The five stations included in this blend were Brookings, Redfield and Selby, South Dakota and Morris and St. Paul, Minnesota.

Data from the northeast area blend are given in Table 4. The four stations included in this blend were Fargo, Minot, and Carrington, North Dakota and Crookston, Minnesota. Langdon, North Dakota samples were not included in the area blend because of the wheat characteristics. These samples were processed individually, and the data are reported in Table 7.

Data from the midwestern area blend are given in Table 5. The four stations included in this blend were Williston and Dickinson, North Dakota; Sidney Montana; and Sheridan, Wyoming. Powell, Wyoming was not included in the area blend because of the wheat characteristics. These samples were processed individually, and the data are reported in Table 8.

Data from the western area blend are given in Table 6. The five stations included in this blend were Havre and Bozeman, Montana; Aberdeen and Teton, Idaho; and Pullman, Washington.

Discussion of Area and Crop Year Averages

In Tables 1 and 2 are given the average area results for the combined data of the varieties Butte, Chris, Era and Stoa samples submitted from the 7 states and 18 stations. The area average represents all samples that were grown in that area for the year cited.

The milling and baking results were obtained from the area blend of the wheats in equal proportions from each of the stations for the respective variety or selection. The regular 100 g straight dough rich formula was used in baking. The General Evaluation column includes the overall performance of the blend of each sample. The general evaluation given for the sample area blend may not agree with that of the individual wheat samples within the blend, since averages do not express the range, and poor characteristics may be masked. In an endeavor to clarify this problem, we have included in the discussion of the varieties and selections, the average general evaluation, the number of total deficiencies and the number of major deficiencies -- (Average General Evaluation - #Total Deficiencies/#Major Deficiencies).

Also given in Tables 1 and 2 are comparisons of the previous five crop years, which include all selections grown in the Uniform Regional Nursery for that year, as well as the 5 YA. The 1987 crop kernel characteristics (test weight and 1000 kernel weight) were higher than the 5 YA. Bake absorption was 2.9% higher than the 5 YA while the mixing time was equal to the 5 YA. The dough character and crumb grain was equal to the 5 YA.

The General Score shows both crop years 1987 and 1986 to be equal. The bake absorption was 1.6% higher than the 1986 crop, but the loaf volume was lower for the 1987 crop. The mixing time for the 1987 crop was 1/4 minute longer than the 1986 crop. The test weight and 1000 KWT were slightly better for the 1987 crop while the flour extraction was equal to the 1986 crop. Both the wheat and flour protein were 0.5% better than the 1986 crop.

#### Discussion of Individual Varieties or Selections

For simplicity and brevity, as in previous reports, each selection or variety will be discussed from the general viewpoint rather than the individual areas.

Average results of the varieties Butte, Chris and Stoa for each of the individual areas were used as standards for the other selections from that area; therefore, a variety or selection may be rated satisfactory in two different areas, but comparison of the data may show much poorer results for one area due to adverse environmental conditions. Thus the sample with poor results could be rated as having unsatisfactory quality when compared with the overall spring wheat area, even though it may be rated as showing good promise for one area.

By using the same format as used in previous years and employment of the computer, all named varieties receive a general evaluation. (The word descriptions of these numerical scores are as follows: 1-1.4, no promise; 1.5-2.4, little promise; 2.5-3.4, some promise; 3.5-4.0, good promise.) Only those varieties in the "Good Promise" category could be consistently considered as acceptable to the trade both in the domestic, as well as foreign markets. Data for the named varieties of Butte, Chris, Era, Marquis and Stoa will be an average of each variety for the last three years.

<u>Butte</u>	(3.6 - 15/5)	<u>8/</u>	- Good Promise
<u>Chris</u>	(3.8 - 15/4)		- Good Promise
<u>Era</u>	(3.3 - 24/8)		- Some Promise
<u>Marquis</u>	(3.4 - 24/9)		- Some Promise
<u>Stoa</u>	(3.9 - 6/2)	<u>9/</u>	- Good Promise

FA984-384 (3.7 - 9/2) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour extraction.

Baking Evaluation - Crumb color, crumb grain.

General Evaluation - Good promise.

HS 84-41 (3.7 - 10/1) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mixograph pattern, mix time, crumb grain, loaf volume.

General Evaluation - Good promise.

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8/ (Average General Evaluation - # Total Deficiencies/Major Deficiencies)

9/ First year as a check in the Uniform Regional Nursery.

HS 84-692 (3.6 - 11/2) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

HS 84-700 (3.0 - 26/8) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein, test weight.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph pattern, mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

HS 84-873 (3.0 - 28/8) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein, test weight.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph pattern, dough character, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

MN 81110 (3.7 - 22/4) (2 yrs.)

Faults:

Kernel Characteristics - Test weight.

Milling Performance - Ash at 65% extraction.

Baking Evaluation - Mixograph pattern, mix time, crumb color, crumb grain.

General Evaluation - Good promise.

MN 82047 (3.1 - 25/12) (3 yrs.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mix time, crumb grain, loaf volume.

General Evaluation - Some promise.

MN 82354 (3.4 - 18/6 (2 yrs.)

Faults:

Kernel Characteristics - Test weight, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

MN 84056 (2.9 - 11/7) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, crumb color, loaf volume.

General Evaluation - Some promise.

MN 84662 (3.7 - 10/3) (2 yrs.)

Faults:

Kernel Characteristics - Test weight.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb grain.

General Evaluation - Good promise.

MT 8336 (3.8 - 9/1) (1 yr.)

Faults:

Kernel Characteristics - Test weight, 1000 KWT, small kernels.

Milling Performance - Flour extraction.

Baking Evaluation - Mixograph pattern, mix time, crumb grain.

General Evaluation - Good promise.

MT 8446 (3.1 - 16/7) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour extraction.

Baking Evaluation - Mixograph pattern, mix time, dough character, crumb grain.

General Evaluation - Some promise.

ND 606 (3.6 - 15/8) (3 yrs.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein, flour extraction.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

ND 618 (3.7 - 10/3) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

ND 622 (3.7 - 11/4) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

ND 626 (3.6 - 10/6) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph pattern, crumb grain, loaf volume.

General Evaluation - Good promise.

ND 640 (3.3 - 12/4) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mixograph pattern, mix time, dough character, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

PR 2385 (3.1 - 14/6) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour extraction.

Baking Evaluation - Mixograph pattern, mix time, crumb grain, loaf volume.

General Evaluation - Some promise.

RH Hybrid (3.4 - 9/5) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Satisfactory.

Baking Evaluation - Mixograph pattern, dough character, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

RH Line 31 (3.5 - 7/5) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Satisfactory.

Baking Evaluation - Dough character, crumb grain, loaf volume.

General Evaluation - Good promise.

RH Line 32 (3.5 - 13/3) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mixograph pattern, mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

SD 2980 (3.7 - 12/3) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

SD 2999 (3.8 - 5/2) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour extraction.

Baking Evaluation - Crumb grain.

General Evaluation - Good promise.

SD 3000 (3.7 - 9/1) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph pattern, mix time, crumb grain, loaf volume.

General Evaluation - Good promise.

SD 3005 (3.7 - 7/3) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb color, crumb grain.

General Evaluation - Good promise.

SD 8052 (3.6 - 7/2) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Crumb grain, loaf volume.

General Evaluation - Good promise.

W2501 (3.4 - 12/2) (1 yr.)

Faults:

Kernel Characteristics - Test weight, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph pattern, mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

WA 7328 (3.6 - 7/2) (1 yr.)

Faults:

Kernel Characteristics - Test weight, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mix time, crumb grain.

General Evaluation - Good promise.

WA 7329 (3.3 - 18/7) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, loaf volume.

General Evaluation - Some promise.

1987 UNIFORM REGIONAL HARD RED SPRING WHEAT  
NURSERY SAMPLES NOT INCLUDED  
IN THE AREA BLENDS

Langdon, North Dakota

This station was not included in the area blend because of kernel characteristics. Butte 86 and Stoa were used as the standards. The data for this station are given in Table 7.

Powell, Wyoming

This station was not included in the area blend because of kernel characteristics. Butte 86 and Era were used as the standards. The data for this station are given in Table 8.

Havre, Montana

One variety, PR 2369, was received from this station. Our 1987 standard was used as the standard. The data for this sample are given in Table 9.

Williston, North Dakota

One variety, Len, and one selection, Gap 5, were received from this station. Our 1987 standard was used as the standard. The data for these samples are given in Table 10.

Carrington, North Dakota

PR 2369 was received from this station. Our 1987 standard was used as the standard. The data for this sample are given in Table 11.

Sheridan, Wyoming

Six selections were received from this station. Our 1987 standard was used as the standard. The data for these samples are given in Table 12.

Pullman, Washington

Two varieties and two selections were received from this station. Our 1987 standard was used as the standard. The data for these samples are given in Table 13.

FIELD PLOT NURSERY SAMPLES - 1987 CROP

Forty-three samples were received from three states at five stations. The data for the individual samples are given in Tables 14-18.

Fargo, Minot and Langdon - North Dakota

Seven named varieties were received from Fargo using Len and Stoa as the standards. Six named varieties were received from Minot using Len and Stoa as the standards. Six named varieties were also received from Langdon. Len and Stoa were used as the standards. The average general score for Fargo is 3.6, for Minot 3.7 and for Langdon 3.6. The data for these three stations are given in Tables 14 -16.

Imperial Valley - California

Four varieties and ten selections were received from this station using Yecora Rojo as the standard. The data for this station are given in Table 17. The average general score for this station is 2.1.

Ithaca, New York

Six named varieties and four selections were received from this station using Marshall and Stoa as the standards. The data for this station are given in Table 18. The average general score for this station is 3.1.

EXPLANATION OF ABBREVIATIONS LISTED UNDER THE  
HEADINGS AND THOSE THAT MAY BE LISTED UNDER  
MINOR AND MAJOR DEFICIENCIES ON COMPUTER PRINTOUT

TW = Test Weight

KW = 1,000 Kernel Weight

LG = Large Kernels

SM = Small Kernels

WM = Wheat Mineral

WP = Wheat Protein

EX = Flour Extraction

M65 = Mineral at 65% Flour Extraction

FP; FLR PRO = Flour Protein

MC; MLG CHAR = Milling Characteristics

MLG PER = Milling Performance

MIX ABS = Mixograph Absorption

MX; MIX PAT = Mixograph Pattern Score

BA; BAKE ABS = Actual Bake Absorption

MT; MIX TIME = Actual Dough Mixing Requirements

DC; DOUGH CHAR = Dough Handling Characteristics

CC; CRUMB COLOR = Example - 100 5

100 = Score received for brightness of the  
crumb grain

5 = Creamy-the color characteristic of  
that particular loaf (only the  
second score is faulted)

CG; CRUMB GRAIN = Example - 86 5

86 = Score received for crumb grain

5 = Open-or characteristic of that  
loaf's crumb grain (only the  
second score is faulted)

LV; LOAF VOL = Loaf Volume

FOOTNOTES FOR TABLES

These footnotes are applicable for specified column headings in all tables that follow

<u>Column Heading</u>	<u>Footnote</u>
TEST WT	Clean dry - Subtract 1 lb/bu for dockage-free TW.
WHT ASH, WHT PRO, ASH @ 65%, FLR PRO, BAKE ABS (100 g loaf)	14% Moisture basis.
MILL CHAR	5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.
MIX PAT	Refer to reference mixograms for numerical curve pattern. (1 = Very weak - - - 11 = Very strong.)
DOUGH CHAR	9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable. 6 = Pliable. 5 = Very pliable. 4 = Very elastic. 3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable. 0 = Dead.
CRUMB COLOR	First column: A realistic score of brightness compared with a 1984 ND standard scored as 100. Second column: 9 = Bright white. 8 = White. 7 = Normal. 6 = Slightly creamy. 5 = Bright creamy. 4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray. 0 = Dull.
CRUMB GRAIN	First column: A relative overall crumb grain score as compared with a 1984 ND standard scored as 90. Second column: 12 = Normal. 11 = Slightly irregular. 10 = Slightly open. 9 = Slightly irregular and slightly open. 8 = Slightly open and slightly irregular. 7 = Irregular. 6 = Open. 5 = Irregular and slightly open. 4 = Open and slightly irregular. 3 = Irregular and open. 2 = Open and irregular. 1 = Harsh. 0 = Soggy.

QUALITY DATA OF UNIFORM REGIONAL BLENDS  
AREA AND CROP-YEAR AVERAGES

TABLE 1

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING			WHT SM %	WHT PRO %	HARDNESS %	WHEAT SCORE %	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR %	MILL SCORE %	MIX ABS %	MIX PAT %
				K.WT	LG G.	%											
<b>*** WESTERN AREA ***</b>																	
AREA AVERAGE		61.8	35.6	46	2	1.52	14.4	75	4	69.2	0.32	13.5	5	4	67.8	5	
BUTTE 86	S	61.9	34.8	45	2	1.55	15.3	80	4	67.7	0.32	14.3	4	4	70.0	5	
CHRIS	S	61.5	30.0	24	2	1.54	15.4	78	4	69.7	0.32	14.8	5	4	67.6	4	
ERA	S	62.6	31.8	34	3	1.51	13.6	80	3	70.2	0.34	12.7	5	3	65.0	4	
STOA	S	61.8	35.2	47	1	1.56	15.1	84	4	69.5	0.30	14.1	5	4	70.6	5	
<b>*** NORTHEASTERN AREA ***</b>																	
AREA AVERAGE		61.1	32.2	36	3	1.68	14.8	65	4	69.6	0.36	13.8	5	4	67.3	6	
BUTTE 86	S	61.9	32.6	48	2	1.63	15.3	76	4	70.1	0.36	14.1	5	4	68.2	5	
CHRIS	S	61.3	28.5	21	3	1.67	15.9	71	4	70.6	0.37	14.7	5	4	67.6	4	
ERA	S	60.9	29.6	34	4	1.73	14.6	71	4	70.9	0.40	13.4	5	4	65.7	6	
STOA	S	60.9	29.9	26	3	1.62	14.9	70	4	70.3	0.38	14.1	5	4	68.2	7	
<b>*** SOUTHEASTERN AREA ***</b>																	
AREA AVERAGE		59.4	30.6	34	4	1.78	15.2	72	4	67.9	0.39	14.4	4	4	65.8	6	
BUTTE 86	S	60.6	32.9	45	3	1.70	15.2	83	4	67.7	0.36	14.5	4	4	67.3	5	
CHRIS	S	59.8	27.5	21	3	1.79	16.3	80	4	67.0	0.42	15.6	4	4	65.7	4	
ERA	S	59.7	28.0	24	4	1.73	14.6	76	4	68.2	0.39	13.9	5	4	62.5	5	
STOA	S	60.1	29.4	25	4	1.77	15.1	77	4	67.6	0.38	14.1	4	4	66.3	7	
<b>*** MIDWESTERN AREA ***</b>																	
AREA AVERAGE		60.9	32.2	32	3	1.51	15.3	70	4	69.2	0.33	14.4	5	4	68.5	6	
BUTTE 86	S	61.5	32.5	36	2	1.52	15.6	78	4	68.4	0.32	14.7	5	4	68.8	5	
CHRIS	S	61.0	28.4	17	3	1.51	15.6	74	4	69.7	0.32	14.8	5	4	67.6	5	
ERA	S	61.9	30.1	24	4	1.54	14.4	77	4	68.9	0.34	13.6	5	4	65.3	5	
STOA	S	61.0	30.8	22	2	1.60	15.0	73	4	69.1	0.34	14.3	5	4	68.2	6	
<b>*** CROP-YEAR AVERAGES ***</b>																	
1983 AVERAGE		59.4	30.6	19	4	1.81	14.7	-	4	68.8	0.39	13.7	5	4	64.0	5	
1984 AVERAGE		60.0	31.5	30	5	1.66	13.7	-	3	69.9	0.39	13.0	5	4	62.7	5	
1985 AVERAGE		60.8	32.4	33	3	1.62	14.0	-	4	70.6	0.36	13.0	5	4	64.3	4	
1986 AVERAGE		59.0	29.8	23	5	1.77	14.4	67	4	69.3	0.37	13.4	5	4	65.8	5	
1987 AVERAGE		60.8	32.6	37	3	1.62	14.9	70	4	69.0	0.35	14.0	5	4	67.3	6	
1983-87 AVG	S	60.0	31.4	28	4	1.70	14.3	69	4	69.5	0.37	13.4	5	4	64.8	4	

QUALITY DATA OF UNIFORM REGIONAL BLENDS  
AREA AND CROP-YEAR AVERAGES

TABLE 1 (Cont.)

VARIETY	STD	% ABS	MIN	BAKE MIX DOUGH			CRUMB COLOR	GRAIN VOL	LOAF SCORE CC	GENERAL SCORE			DEFICIENCIES					
				BAKE AREA	MIX AREA	DOUGH AREA				GENERAL SCORE	TW	KW	SM	WP	EX	A65 FP	MC	MX
<b>*** WESTERN AREA ***</b>																		
AREA AVERAGE				68.6	3.25	8			101 7	87	5	891	4			4.0		
BUTTE 86	S	71.0	2.75	8			100 7	86	4	830	1		3.0					
CHRIS	S	68.9	2.50	9			100 7	88	6	915	3		3.7					
ERA	S	66.4	3.00	8			100 7	89	8	865	4		3.3					
STOA	S	71.7	3.00	9			100 7	88	6	930	4		4.0					
<b>*** NORTHEASTERN AREA ***</b>																		
AREA AVERAGE				68.6	4.50	8			101 7	87	5	876	4			4.0		
BUTTE 86	S	68.8	3.50	9			101 8	89	6	940	4		4.0					
CHRIS	S	68.5	3.25	9			100 7	87	4	915	3		3.7					
ERA	S	66.7	4.00	8			100 7	88	6	865	4		4.0					
STOA	S	69.5	4.75	8			100 7	86	3	850	3		3.7					
<b>*** SOUTHEASTERN AREA ***</b>																		
AREA AVERAGE				66.2	4.75	8			101 7	87	4	917	3			3.7		
BUTTE 86	S	68.2	3.75	9			100 7	89	6	915	4		4.0					
CHRIS	S	66.5	3.00	9			101 7	87	5	960	4		4.0					
ERA	S	63.1	5.50	8			100 7	88	3	875	2		3.3					
STOA	S	66.9	4.50	9			101 7	89	5	905	4		4.0					
<b>*** MIDWESTERN AREA ***</b>																		
AREA AVERAGE				69.8	4.25	8			101 7	87	6	910	4			4.0		
BUTTE 86	S	69.9	3.25	9			100 7	89	11	965	4		4.0					
CHRIS	S	68.6	3.50	9			100 7	87	4	990	3		3.7					
ERA	S	66.8	4.00	9			100 8	88	7	915	4		4.0					
STOA	S	69.9	4.25	9			100 7	87	3	930	3		3.7					
<b>*** CROP-YEAR AVERAGES ***</b>																		
1983 AVERAGE				64.3	4.25	8			101 7	88	6	926	4			4.0		
1984 AVERAGE				63.5	4.25	8			101 6	88	7	872	4			3.7		
1985 AVERAGE				64.4	4.00	8			101 7	88	6	876	4			4.0		
1986 AVERAGE				66.7	4.00	9			101 7	88	7	934	4			4.0		
1987 AVERAGE				63.3	4.25	8			101 7	87	5	898	4			4.0		
1983-87 AVG	S	65.4	4.25	8			101 7	88	6	901	4		4.0					

QUALITY DATA OF UNIFORM REGIONAL BLENDS  
AREA AND CROP-YEAR AVERAGES

TABLE 2

VARIETY	STD	#/BU	TEST	1000	SIZING	WHT	HARD-	WHEAT	FLR	ASH @	FLR	MILL	MILL	MIX	MIX	
			WT	K.WT	LG	SM	ASH	PRO	NESS	EXT	65%EX	PRO	CHAR	SCORE	ABS	PAT
			%	%	%	%	*	%	%	*	%	*	%	***	%	
<b>*** WESTERN AREA ***</b>																
AREA AVERAGE		61.3	33.9	39	2	1.51	14.8	73	4	69.2	0.33	14.0	5	4	68.1	5
BUTTE 86	S	61.7	33.7	41	2	1.54	15.5	79	4	68.1	0.32	14.5	5	4	69.4	5
CHRIS	S	61.3	29.2	91	3	1.53	15.5	76	4	60.7	0.32	14.5	5	2	69.4	5
ERA	S	62.3	31.0	29	4	1.53	14.0	79	4	69.6	0.34	13.2	5	4	65.2	5
STOA	S	61.4	33.0	35	2	1.58	15.1	79	4	69.3	0.32	14.2	5	4	69.4	6
<b>** NORTHEASTERN AREA **</b>																
AREA AVERAGE		61.1	32.2	36	3	1.68	14.8	65	4	69.6	0.36	13.8	5	4	67.3	6
BUTTE 86	S	61.9	32.6	48	2	1.63	15.3	76	4	70.1	0.36	14.1	5	4	68.2	5
CHRIS	S	61.3	28.5	21	3	1.67	15.9	71	4	70.6	0.37	14.7	5	4	67.6	4
ERA	S	60.9	29.6	34	4	1.73	14.6	71	4	70.9	0.40	13.4	5	4	65.7	6
STOA	S	60.9	29.9	26	3	1.62	14.9	70	4	70.3	0.38	14.1	5	4	68.2	7
<b>*** SOUTHEASTERN AREA ***</b>																
AREA AVERAGE		59.4	30.6	34	4	1.78	15.2	72	4	67.9	0.39	14.4	4	4	65.8	6
BUTTE 86	S	60.6	32.9	45	3	1.70	15.2	83	4	67.7	0.36	14.5	4	4	67.3	5
CHRIS	S	59.8	27.5	21	3	1.79	16.3	80	4	67.0	0.42	15.6	4	4	65.7	4
ERA	S	59.7	28.0	24	4	1.73	14.6	76	4	68.2	0.39	13.9	5	4	62.5	5
STOA	S	60.1	29.4	25	4	1.77	15.1	77	4	67.6	0.38	14.1	4	4	66.3	7
<b>*** CROP-YEAR AVERAGES ***</b>																
1983 AVERAGE		59.4	30.6	19	4	1.81	14.7	.	4	68.8	0.39	13.7	5	4	64.0	5
1984 AVERAGE		60.0	31.5	30	5	1.66	13.7	.	3	69.9	0.39	13.0	5	4	62.7	5
1985 AVERAGE		60.8	32.4	33	3	1.62	14.0	.	4	70.6	0.36	13.0	5	4	64.3	4
1986 AVERAGE		59.0	29.8	23	5	1.77	14.4	67	4	69.3	0.37	13.4	5	4	65.8	5
1987 AVERAGE		60.8	32.6	37	3	1.62	14.9	70	4	69.0	0.35	14.0	5	4	67.3	6
1983-87 AVG	S	60.0	31.4	28	4	1.70	14.3	69	4	69.5	0.37	13.4	5	4	64.8	5

## QUALITY DATA OF UNIFORM REGIONAL BLENDS AREA AND CROP-YEAR AVERAGES

TABLE 2 (Cont.)

DEFICIENCIES--									
VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL	BAKE SCORE	GENERAL SCORE
*** WESTERN AREA ***									
AREA AVERAGE	S	69.2	3.75	8	101	7	87	5	900
BUTTE 86	S	70.5	3.00	9	100	7	88	8	898
CHRIS	S	68.8	3.00	9	100	7	88	5	953
ERA	S	66.6	3.50	9	100	8	89	8	890
STOA	S	70.8	3.75	9	100	7	88	5	930
*** NORTHEASTERN AREA ***									
AREA AVERAGE	S	68.6	4.50	8	101	7	87	5	876
BUTTE 86	S	68.8	3.50	9	101	8	89	6	940
CHRIS	S	68.5	3.25	9	100	7	87	4	915
ERA	S	66.7	4.00	8	100	7	88	6	865
STOA	S	69.5	4.75	8	100	7	86	3	850
*** SOUTHEASTERN AREA ***									
AREA AVERAGE	S	66.2	4.75	8	101	7	87	4	917
BUTTE 86	S	68.2	3.75	9	100	7	89	6	915
CHRIS	S	66.5	3.00	9	101	7	87	5	960
ERA	S	63.1	5.50	8	100	7	88	3	875
STOA	S	66.9	4.50	9	101	7	89	5	905
*** CROP-YEAR AVERAGES ***									
1983 AVERAGE	S	64.3	4.25	8	101	7	88	6	926
1984 AVERAGE	S	63.5	4.25	8	101	6	88	7	872
1985 AVERAGE	S	64.4	4.00	8	101	7	88	6	876
1986 AVERAGE	S	66.7	4.00	9	101	7	88	7	934
1987 AVERAGE	S	68.1	4.25	8	101	7	87	5	898
1981-87 AVG	S	65.4	4.25	8	101	7	88	6	901

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=. STATION=SOUTHEASTERN AREA NURSERY=BLEND

TABLE 3

VARIETY	STD #/BU	TEST WT G.	1000 K.WT G.	SIZING			WHT ASH %	HARD- NESS %	WHEAT PRO %	FLR EXT %	ASH @ 65%EX %	FLR FRO %	MILL CHAR %	MILL SCORE ***	MIX ABS %	MIX PAT %	
				WT LG. %	SM %	ASH %											
BUTTE 86	S	60.6	32.9	45	3	1.70	15.2	83	4	67.7	0.36	14.5	4	4	4	4	4
CHRIS	S	59.8	27.5	21	3	1.79	16.3	80	4	67.0	0.42	15.6	4	4	4	4	4
ERA	S	59.7	28.0	24	4	1.73	14.6	76	4	68.2	0.39	13.9	5	4	4	4	5
MARQUIS	S	58.5	26.1	16	5	1.84	14.8	67	4	65.9	0.42	14.1	4	4	4	4	4
STOA	S	60.1	29.4	25	4	1.77	15.1	77	4	67.6	0.38	14.1	4	4	4	3	7
FA 384-384	S	62.1	33.0	40	2	1.71	15.7	84	4	65.6	0.40	14.8	4	4	4	4	4
HS 84-41	S	58.3	33.6	40	5	1.89	15.3	87	4	67.6	0.45	14.3	4	4	4	4	7
HS 84-692	S	59.3	28.7	27	5	1.91	14.4	66	4	67.5	0.42	14.0	4	4	4	4	5
HS 84-700	S	58.4	29.9	34	6	1.74	14.4	62	4	67.7	0.44	13.9	4	4	4	4	7
HS 84-873	S	59.4	31.7	40	4	1.72	14.4	67	4	70.2	0.40	13.8	5	4	4	4	8
MN 811110	S	58.0	34.1	42	3	1.88	16.7	74	4	67.0	0.47	15.8	4	4	4	4	7
MN 82047	S	60.2	32.6	43	3	1.76	14.5	81	4	68.8	0.44	13.6	5	4	4	4	7
MN 82354	S	59.1	32.1	40	4	1.82	15.5	68	4	69.4	0.38	14.7	5	4	4	4	5
MN 84056	S	60.9	31.6	46	3	1.80	14.3	65	4	70.2	0.36	13.1	5	4	4	4	7
MN 84662	S	58.9	31.6	37	5	1.87	16.1	84	4	66.7	0.37	14.7	4	4	4	4	4
MT 83356	S	57.5	26.3	6	10	1.78	14.7	67	4	65.9	0.38	14.3	4	4	4	4	7
MT 8446	S	58.7	28.7	19	7	1.77	15.0	62	4	63.9	0.42	14.4	4	4	4	4	9
ND 606	S	60.0	30.5	35	3	1.65	15.6	96	4	67.5	0.40	14.6	4	4	4	4	6
ND 618	S	59.7	28.7	25	3	1.96	16.1	84	4	67.8	0.40	15.4	4	4	4	4	6
ND 622	S	60.8	29.9	37	3	1.75	15.9	80	4	67.7	0.37	15.1	4	4	4	4	3
ND 626	S	60.2	33.5	49	3	1.74	15.7	78	4	68.2	0.36	15.1	5	4	4	4	6
ND 640	S	60.5	28.4	27	4	1.62	15.8	76	4	68.5	0.34	15.1	5	4	4	4	6
PR 2385	S	59.7	30.3	29	4	1.68	15.9	74	4	67.1	0.35	14.9	4	4	4	4	8
RH HYBRID	S	59.9	30.4	32	5	1.79	14.4	67	4	69.3	0.40	13.8	5	4	4	4	5
RH LINE 31	S	60.0	29.3	24	7	1.85	14.3	52	4	67.8	0.39	13.9	4	4	4	4	2
RH LINE 32	S	58.1	29.8	35	4	1.86	14.9	46	4	68.2	0.38	14.6	5	4	4	4	7
SD 2980	S	62.0	32.9	46	2	1.68	15.1	71	4	69.5	0.33	14.4	5	4	4	4	5
SD 2999	S	59.1	31.7	43	4	1.77	15.4	67	4	66.7	0.41	14.9	4	4	4	4	6
SD 3000	S	59.9	27.9	41	3	1.79	15.2	70	4	67.5	0.40	14.1	4	4	4	4	7
SD 3005	S	60.6	32.1	46	3	1.74	15.2	62	4	69.0	0.34	14.4	5	4	4	4	6
SD 8052	S	60.3	31.9	41	2	1.77	15.0	80	4	69.2	0.44	14.1	5	4	4	4	6
W 7501	S	57.7	31.2	41	4	1.69	14.2	59	4	70.0	0.38	13.8	5	4	4	4	6
WA 7328	S	59.9	30.7	36	6	1.82	14.7	59	3	69.2	0.38	13.9	5	4	4	4	4
WA 7329	S	56.5	33.2	39	4	1.76	15.0	63	3	67.5	0.45	14.5	4	4	4	4	2

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=. STATION=SOUTHEASTERN AREA NURSERY=BLEND

TABLE 3 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	GRAIN VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES--TW KW SM WF EX A65 FP MC MX BA MT DC CC CG LV							
									**	***	MI	MJ	MI	MJ	MI	MJ
BUTTE 96	S	68.2	3.75	9	100	7	89	6	915	4	4.0					
CHRIS	S	66.5	3.00	9	101	7	87	5	960	4	4.0	MI				
ERA	S	63.1	5.50	8	100	7	88	3	875	3	3.7	MJ				
MARQUIS	S	63.4	4.00	8	100	7	90	12	870	3	3.7	MI				
STOA	S	66.9	4.50	9	101	7	89	5	905	4	4.0	MI				
FA 984-384	S	66.6	3.50	8	100	6	88	8	905	4	4.0	MI				
HS 84-41	S	65.7	6.00	8	100	7	87	6	890	3	3.7	MI				
HS 84-692	S	65.0	4.50	9	101	6	87	5	970	4	4.0	MI				
HS 84-700	S	65.6	5.75	9	101	6	87	3	905	2	3.3	MI				
HS 84-873	S	64.5	5.50	8	101	4	86	3	890	3	3.7	MI				
MN 81110	S	71.5	4.75	9	101	4	86	4	1000	3	3.7	MI				
MN 82047	S	65.5	4.50	8	101	7	88	6	885	4	4.0	MI				
MN 82354	S	67.1	3.75	8	100	4	87	3	885	3	3.7	MI	NJ	MI	MJ	MI
MN 84056	S	65.4	4.75	8	101	7	87	4	845		3.3	MI				
MN 84662	S	67.1	3.00	9	100	7	87	3	380		3.7	MI				
MT 8336	S	66.5	5.75	9	101	8	89	6	965	1	2.7	MI				
MT 8446	S	65.0	7.00	4	101	8	87	3	915		3.3	MI				
ND 606	S	68.2	3.50	9	101	6	85	3	950		3.7	MI				
ND 618	S	68.3	3.50	9	100	7	88	5	995		4.0	MI				
ND 622	S	66.9	4.00	9	100	7	88	4	900		3.7	MI				
ND 626	S	68.2	5.00	9	100	7	86	3	915		3.7	MI				
ND 640	S	67.3	6.50	9	100	7	86	3	890	2	3.3	MI				
FR 2385	S	70.0	6.00	8	100	8	87	3	845	1	3.0	MI				
RH HYBRID	S	66.5	5.25	9	101	8	86	3	990		3.7	MI				
RH LINE 31	S	64.7	4.75	9	102	8	85	3	975		3.7	MI				
RH LINE 32	S	65.1	6.00	9	101	4	88	3	975	2	3.3	MI				
SD 2980	S	67.2	4.50	8	101	6	86	7	875	4	4.0	MI				
SD 2999	S	67.5	4.00	9	100	8	87	3	1005		3.7	MI				
SD 3000	S	65.1	6.00	8	100	8	88	4	890	2	3.3	MI				
SD 3005	S	63.5	4.50	9	102	8	88	3	900	3	3.7	MI				
SD 8052	S	65.1	5.00	8	101	7	87	4	850	2	3.3	MI				
W 2501	S	65.0	4.75	8	101	6	88	4	865	2	3.3	MJ				
WA 7328	S	64.5	4.25	9	102	8	87	3	920	3	3.0	MJ				
WA 7329	S	64.3	3.75	8	102	3	87	3	870	2	3.0	MJ				

DEFICIENCIES FW MW SM WR BX AGG IP MIX FMT QHT DC CC CG LV  
MINOR FAULTING VALUES 57.9 27.8 8 13.9 65.3 .47 12.9 3 27.8 61.9 5.75-8.00 2.00-2.75 6 6 8 872  
MAJOR FAULTING VALUES 56.9 24.8 18 12.9 63.3 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 822

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=. STATION=NORTHEASTERN AREA NURSERY=BLEND

TABLE 4

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG.	WHT SM %	ASH %	HARDNESS %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	CHAR %	MILL SCORE ***	MILL ABS %	MIX FAT %	MIX %
BUTTE 86	S	61.9	32.6	48	2	1.63	15.3	76	4	70.1	0.36	14.1	5	4	68.2	5
CHEFIS	S	61.3	28.5	21	3	1.67	15.9	71	4	70.6	0.37	14.7	5	4	67.6	4
ERA	S	60.9	29.6	34	4	1.73	14.6	71	4	70.9	0.40	13.4	5	4	65.7	6
MARQUIS	S	60.2	28.0	19	4	1.70	14.5	62	4	69.2	0.40	13.4	5	4	65.3	5
STOA	S	60.9	29.9	26	3	1.62	14.9	70	4	70.3	0.38	14.1	5	4	68.2	7
FA 984-384	S	63.6	33.7	40	2	1.63	15.1	71	4	68.1	0.36	14.0	5	0	67.6	5
HS 84-41	S	60.1	35.8	44	2	1.72	14.5	73	4	71.0	0.41	13.5	5	4	68.2	7
HS 84-692	S	59.9	29.4	28	5	1.80	14.5	60	4	71.3	0.41	13.7	5	4	67.6	5
HS 84-700	S	63.6	31.7	43	3	1.63	14.2	56	4	71.6	0.40	13.6	5	4	67.6	7
HS 84-873	S	61.3	34.0	44	3	1.64	14.0	64	4	72.2	0.36	13.0	5	4	67.0	6
MN 81110	S	60.0	35.2	47	2	1.82	15.8	67	4	70.1	0.38	14.9	5	4	71.2	7
MN 82047	S	61.9	33.6	45	3	1.75	14.2	75	4	70.7	0.37	13.1	5	4	66.6	5
MN 82354	S	60.6	32.3	36	3	1.65	14.7	58	4	70.4	0.35	13.7	5	4	66.3	5
MN 84056	S	62.5	33.2	48	2	1.82	14.0	59	4	71.6	0.33	13.0	5	4	65.7	5
MN 84662	S	61.2	34.6	40	2	1.74	15.6	78	4	69.0	0.36	14.2	5	4	67.6	5
MT 8336	S	59.8	29.1	10	6	1.56	14.1	64	4	67.1	0.38	13.2	4	0	67.6	7
MT 8446	S	60.6	30.9	16	3	1.59	14.1	54	4	65.0	0.38	13.3	4	4	65.3	9
ND 606	S	61.7	31.6	32	3	1.67	14.8	78	4	68.8	0.36	13.6	5	4	67.9	6
ND 618	S	60.3	28.8	19	4	1.77	15.3	67	4	68.7	0.36	14.5	5	4	69.1	6
ND 622	S	62.2	31.1	36	3	1.69	15.1	68	4	69.3	0.34	14.0	5	4	68.5	6
ND 626	S	62.0	34.9	50	2	1.69	15.2	71	4	69.6	0.37	14.1	5	4	68.5	6
ND 640	S	62.3	31.0	28	2	1.65	15.6	64	4	69.3	0.31	14.8	5	4	68.2	7
PR 2385	S	61.6	32.6	39	1	1.57	15.3	66	4	67.5	0.33	14.0	4	0	70.9	8
RH HYBRID	S	61.7	33.3	34	3	1.75	14.1	59	4	69.3	0.38	13.2	5	4	67.3	6
RH LINE 31	S	61.7	31.6	30	3	1.61	14.3	49	4	69.9	0.35	13.5	5	4	65.0	6
FH LINE 32	S	59.9	31.6	35	2	1.63	14.5	47	4	69.1	0.37	13.7	5	4	66.6	7
SD 2980	S	62.8	33.4	40	1	1.50	14.9	69	4	69.1	0.29	13.8	5	4	68.2	5
SD 2999	S	60.3	30.9	33	2	1.60	15.3	64	4	67.1	0.38	14.2	4	0	69.5	6
SD 3000	S	62.0	32.7	44	1	1.74	14.4	64	4	68.3	0.32	13.3	5	4	66.3	7
SD 3005	S	62.1	33.6	50	1	1.67	15.6	62	4	69.1	0.32	14.6	5	4	67.6	6
SD 8052	S	62.1	33.0	39	2	1.53	14.9	73	4	69.1	0.33	13.9	5	4	67.0	6
WA 4901	S	59.3	32.0	42	3	1.77	14.1	51	4	69.9	0.33	13.5	5	4	67.3	7
WA 7328	S	59.5	33.8	39	3	1.68	14.1	54	4	71.3	0.32	13.4	5	4	64.2	4
WA 7329	S	57.9	35.2	40	3	1.79	14.5	57	4	69.8	0.36	13.6	5	4	64.4	4

STATE=. STATION=NORTHEASTERN AREA NURSERY=BLEND

TABLE 4 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	GRAIN VOL	LOAF SCORE CC	GENERAL SCORE ***	DEFICIENCIES					
									TW	KW	SM	WF	EX A65 FP MC MX BA MT DC CC GS LV	
BUTTE 86	S	68.8	3.50	9	101	8	89	6	940	4	4.0			
CHRIS	S	68.5	3.25	9	100	7	87	4	915	3	3.7			
ERA	S	66.7	4.00	8	100	7	88	6	865	4	4.0			
MARQUIS	S	66.4	3.25	8	100	7	89	11	895	4	4.0			
STOA	S	69.5	4.75	8	100	7	86	3	850	3	3.7			
FA 984-384	S	68.9	3.50	8	100	4	86	4	850	3	3.3			
HS 84-41	S	69.7	4.75	8	100	7	88	6	845	3	3.7			
HS 84-692	S	68.7	4.00	9	100	4	87	4	895	3	3.7			
HS 84-700	S	69.0	5.50	8	100	7	85	3	845	2	3.3			
HS 84-873	S	68.0	5.00	4	101	4	87	3	825	1	3.0			
MN 81110	S	72.5	4.50	8	102	4	86	4	870	3	3.7			
MN 82047	S	67.9	4.00	7	101	7	86	3	820	2	3.3			
MN 82354	S	67.2	3.25	8	100	7	88	6	855	4	4.0			
MN 84056	S	66.6	4.25	7	100	7	87	4	845	2	3.3			
MN 84662	S	68.6	3.00	8	100	8	88	7	890	4	4.0			
MT 8336	S	69.0	5.50	8	102	8	83	3	890	3	3.3			
MT 8446	S	66.6	6.50	4	103	9	87	4	940	1	2.3			
ND 606	S	69.2	5.25	9	100	8	88	6	890	4	4.0			
ND 618	S	70.6	4.00	9	102	4	87	4	895	3	3.7			
ND 622	S	69.5	4.00	8	100	6	82	3	885	3	3.7			
ND 626	S	69.6	4.00	9	99	7	88	6	910	4	4.0			
ND 640	S	69.3	5.00	4	99	7	86	3	860	1	3.0			
FIR 2385	S	71.7	6.25	8	102	8	86	3	790	1	2.7			
RH HYBRID	S	68.3	4.25	8	100	7	86	3	860	3	3.7			
RH LINE 31	S	66.9	4.50	8	102	7	87	7	870	4	4.0			
RH LINE 32	S	68.5	6.00	7	101	4	86	3	835	1	3.0			
SD 2380	S	69.5	3.25	8	101	7	88	4	875	3	3.7			
SD 2999	S	70.2	4.50	9	101	8	88	4	950	3	3.3			
SD 3000	S	67.9	4.50	8	102	7	89	6	860	4	4.0			
SD 3005	S	69.3	4.50	9	102	7	88	6	935	4	4.0			
SD 8052	S	69.6	4.50	8	100	7	87	5	845	3	3.7			
WA 2501	S	68.9	5.75	8	100	7	88	6	850	3	3.7			
WA 7328	S	65.1	5.00	9	100	8	89	11	900	4	4.0			
WA 7329	S	65.8	4.00	9	102	8	87	4	940	3	3.7			
												MI	MI	MJ

DEFICIENCIES	TW	IW	SM	WI	LX	AGS	IT	Ph	MX	BA	MIX TIME (MIN)	DC	CC	CU	LV
MINOR FAULTING VALUES	57.9	28.2	8	13.9	60.2	.47	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	847
MAJOR FAULTING VALUES	56.9	25.2	18	12.9	66.2	.51	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	797

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE= STATION=MIDWESTERN AREA NURSEY=BLEND

TABLE 5

VARIETY	STD	TEST WT #/BU	1000 SIZING		WHT ASH %	WHT FRO %	HARDNESS SCORE ***	WHEAT EXT %	ASH @ 65% EX %	FLR PRO %	MILL CHAR %	MILL SCORE ***	MIX ABS %	MIX FAT %
			LG G.	SM %										
BUTTE 86	S	61.5	32.5	36	2	1.52	15.6	78	4	68.4	0.32	14.7	5	68.8
CHRIS	S	61.0	28.4	17	3	1.51	15.6	74	4	69.7	0.32	14.8	5	67.6
ERA	S	61.9	30.1	24	4	1.54	14.4	77	4	68.9	0.34	13.6	5	65.3
MARQUIS	S	60.8	28.9	18	3	1.53	15.4	69	4	68.9	0.35	14.6	4	66.6
STOA	S	61.0	30.8	22	2	1.60	15.0	73	4	69.1	0.34	14.3	4	68.2
FA 984-384	S	62.9	32.2	28	2	1.45	15.6	80	4	68.0	0.32	14.5	5	68.2
HS 84-41	S	60.2	36.3	47	3	1.60	15.4	85	4	68.5	0.39	14.6	4	69.7
HS 84-692	S	60.9	30.7	28	3	1.57	14.7	67	4	71.2	0.34	14.0	4	68.8
HS 84-700	S	59.9	32.9	39	3	1.51	15.0	64	4	70.7	0.33	14.3	4	70.0
HS 84-873	S	61.1	33.8	44	2	1.42	14.9	68	4	69.9	0.33	13.9	4	67.9
MN 81110	S	59.2	35.4	43	3	1.55	16.2	70	4	69.0	0.38	15.3	4	71.5
MN 82047	S	62.0	34.9	44	3	1.42	14.4	82	4	70.5	0.36	13.5	4	67.0
MN 82354	S	60.7	32.6	30	3	1.46	15.1	65	4	70.0	0.32	14.1	4	67.3
MN 84056	S	62.2	32.4	39	2	1.56	14.6	65	4	71.2	0.30	13.7	5	66.6
MN 84662	S	61.2	34.5	39	2	1.50	16.4	86	4	67.8	0.33	14.9	4	67.6
MT 8336	S	61.5	36.3	43	2	1.38	16.2	78	4	68.0	0.31	15.0	5	70.6
MT 8446	S	61.6	33.9	36	2	1.59	16.0	67	4	66.9	0.31	15.1	4	69.4
ND 606	S	61.2	31.3	26	3	1.45	15.8	88	4	66.7	0.33	14.5	4	69.4
ND 618	S	61.6	28.5	17	4	1.54	15.4	79	4	69.6	0.37	14.4	4	70.3
ND 622	S	61.8	30.8	29	2	1.57	15.7	77	4	69.0	0.33	14.9	5	70.9
ND 626	S	62.1	34.5	48	2	1.47	15.5	60	4	70.0	0.33	14.5	4	70.6
ND 640	S	61.9	30.3	21	2	1.42	16.1	72	4	70.3	0.28	15.5	6	70.6
PR 2385	S	59.7	30.2	24	2	1.51	15.9	70	4	68.0	0.29	14.9	5	71.2
RH HYBRID	S	61.2	30.6	28	3	1.57	14.5	63	4	70.6	0.35	14.1	5	69.1
RH LINE 31	S	60.9	31.6	34	3	1.50	14.6	57	4	71.5	0.34	14.2	4	67.3
RH LINE 32	S	59.5	30.3	31	3	1.54	14.4	45	4	68.8	0.33	14.4	4	66.6
SD 2980	S	62.0	33.1	35	2	1.42	15.4	66	4	69.5	0.31	14.5	5	68.2
SD 2999	S	59.7	31.6	31	3	1.57	15.3	62	4	67.8	0.34	14.5	4	68.2
SD 3000	S	60.8	32.5	30	2	1.51	15.1	69	4	68.1	0.34	13.8	5	67.6
SD 3005	S	61.1	31.0	28	2	1.36	15.6	55	4	68.3	0.30	15.1	4	68.2
SD 8052-1	S	61.5	31.4	29	2	1.49	14.8	72	4	69.8	0.37	13.8	5	67.6
WA 2501	S	58.7	34.3	36	3	1.61	14.6	59	4	69.8	0.33	14.2	5	67.9
WA 7323	S	50.1	34.1	31	4	1.51	14.7	61	4	70.8	0.33	13.9	5	66.0
WA 7329	S	58.8	33.6	32	3	1.60	15.3	63	4	68.7	0.37	14.6	5	67.0

## STATE= STATION=MIDWESTERN AREA NURSERY=BLEND

TABLE 5 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	GRAIN VOL	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES--TW KW SM WF EX A65 FP MG MX BA MT DC CC OS LV						
										**	***	MI	MJ	MI	MJ	MI
BUTTE 86	S	69.9	3.25	9	100	7	89	11	965	4	4.0					
CHRIS	S	68.6	3.50	9	100	7	87	4	990	3	3.7	MI				
ERA	S	66.8	4.00	9	100	8	88	7	915	4	4.0	MI				
MARQUIS	S	68.0	3.50	9	100	7	88	4	955	3	3.7	MJ				
STOA	S	69.9	4.25	9	100	7	87	3	930	3	3.7	MI	MI	MI	MI	MI
FA 984-384	S	69.6	3.25	9	100	6	86	3	935	3	3.7					
HS 84-41	S	71.0	4.00	9	100	7	87	7	965	4	4.0	MI				
HS 84-692	S	70.2	4.00	9	101	4	96	3	905	2	2.9	MI				
HS 84-700	S	71.5	5.00	9	100	6	87	3	900	3	3.3	MI	MI	MI	MI	MI
HS 84-873	S	69.2	4.25	8	100	4	84	3	890	3	3.3	MI	MI	MI	MI	MI
MN 81110	S	72.9	5.75	9	100	4	85	3	970	3	3.3	MI	MI	MI	MI	MI
MN 82047	S	68.4	4.25	8	100	7	87	4	865	2	3.3	MI	MI	MI	MI	MI
MN 82354	S	68.7	3.00	9	100	4	87	4	925	3	3.7					
MN 84056	S	68.0	4.00	8	101	8	87	3	815	1	3.0	MI	MI	MI	MI	MI
MN 84662	S	68.9	2.75	9	101	7	88	6	925	3	3.7					
MT 8336	S	72.0	4.00	9	101	8	90	12	925	3	4.0	MI				
MT 8446	S	70.4	5.00	9	100	8	88	6	930	3	3.7	MI				
ND 606	S	70.5	3.50	9	100	8	89	11	935	3	3.7					
ND 618	S	71.7	4.00	8	100	7	89	12	875	3	3.7	MI				
ND 622	S	72.0	4.00	8	101	8	88	6	865	3	3.7	MI	MI	MI	MI	MI
ND 626	S	71.9	4.25	9	101	8	87	4	970	3	3.7	MI	MI	MI	MI	MI
ND 640	S	71.7	4.50	8	101	6	88	6	845	2	3.3	MI	MI	MI	MI	MI
PR 2385	S	72.3	5.00	8	100	7	86	3	825	1	3.0	MI	MI	MI	MI	MI
RH HYBRID	S	70.7	5.00	3	101	6	87	6	790	1	3.0					
RH LINE 31	S	68.7	5.25	4	100	7	87	3	835	1	3.0	MI	MI	MI	MI	MI
RH LINE 32	S	68.0	5.50	9	102	4	88	4	935	3	3.7	MI	MI	MI	MI	MI
SD 2980	S	69.5	3.50	8	102	7	89	8	870	3	3.7					
SD 2999	S	69.5	4.00	9	102	7	89	6	1005	4	4.0	MI				
SD 3000	S	69.0	4.75	9	100	8	88	8	905	3	3.7	MI	MI	MI	MI	MI
SD 3005	S	69.3	4.25	9	102	6	86	3	960	3	3.7	MI	MI	MI	MI	MI
SD 8052-1	S	68.9	4.50	8	100	7	86	4	870	2	3.3					
WA 2501	S	69.3	5.00	8	100	7	88	8	880	3	3.7	MI	MI	MI	MI	MI
WA 7328	S	67.4	4.25	9	101	8	89	8	950	4	4.0					
WA 7329	S	68.4	4.25	9	102	8	89	6	910	4	4.0					

DEFICIENCIES TW SW SM WF EX A65 FP MG MX BA MT DC CC OS LV  
MINOR FAULTING VALUES 57.9 39.5 8 13.9 67.0 .47 12.9 3 2,7,8 61.9 5.75-8.00 2.00-2.75 6 6 6 8 307  
MAJOR FAULTING VALUES 56.9 35.5 18 12.9 65.0 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 857

\* \* \* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE= WESTERN AREA NURSEY-BLEND

TABLE 6

VARIETY	TEST WT #/BU	1000 SIZING			WHT %	ASH %	FRO %	HARDNESS %	WHEAT SCORE %	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR %	MILL SCORE ***	MIX ABS %	MIX FAT %
		K.WT G.	LG %	SM %												
BUTTE 86	S	61.9	34.8	45	2	1.54	15.4	78	4	67.7	0.32	14.3	4	4	4	4
CHRIS	S	61.5	30.0	24	2	1.54	15.4	78	4	69.7	0.32	14.8	5	4	4	4
ERA	S	62.6	31.8	34	3	1.51	13.6	80	3	70.2	0.34	12.7	5	3	3	4
MARQUIS	S	61.7	33.6	45	2	1.53	15.1	76	4	68.2	0.32	14.3	5	4	4	4
STOA	S	61.8	35.2	47	1	1.56	15.1	84	4	69.5	0.30	14.1	5	4	4	5
FA 384-384	S	63.4	35.6	47	1	1.62	15.0	85	4	66.3	0.33	14.1	4	3	3	4
HS 84-41	S	60.3	37.4	46	3	1.55	14.3	82	4	68.5	0.33	13.3	5	4	4	6
HS 84-692	S	61.6	31.7	28	3	1.61	13.9	71	3	70.6	0.29	12.8	5	3	3	4
HS 84-700	S	60.4	34.6	42	3	1.58	13.8	69	3	70.6	0.31	12.9	5	3	3	5
HS 84-873	S	61.5	36.6	50	1	1.44	13.6	73	3	71.2	0.31	12.8	5	3	3	6
MN 81110	S	60.9	39.7	59	2	1.55	14.9	76	4	69.2	0.38	14.2	5	4	4	5
MN 82047	S	63.1	36.8	53	2	1.57	13.2	84	3	70.6	0.34	12.0	5	3	3	4
MN 82354	S	61.5	36.7	50	2	1.54	14.0	71	4	71.5	0.30	13.0	5	4	4	6
MN 84056	S	62.9	35.6	52	2	1.64	13.5	73	3	71.0	0.29	12.4	5	4	4	5
MN 84662	S	62.0	38.3	53	2	1.54	15.1	87	4	68.2	0.44	13.7	5	4	4	4
MT 8336	S	62.6	39.8	52	2	1.44	14.5	80	4	69.0	0.30	13.6	5	4	4	5
MT 8446	S	62.5	36.3	48	1	1.47	14.4	67	4	66.7	0.29	13.5	4	3	3	7
ND 606	S	61.7	33.7	38	2	1.41	14.7	91	4	67.9	0.33	13.6	4	4	4	5
ND 618	S	61.8	32.8	33	1	1.56	15.5	87	4	68.7	0.33	14.5	5	4	4	5
ND 622	S	62.6	34.7	49	1	1.54	15.2	84	4	68.5	0.31	14.4	5	4	4	5
ND 626	S	62.5	38.6	61	2	1.47	14.5	82	4	69.5	0.31	13.6	5	4	4	6
ND 640	S	62.1	31.8	29	2	1.45	14.9	75	4	69.4	0.41	14.4	5	4	4	5
PR 2385	S	61.4	33.2	37	2	1.58	15.5	76	4	67.6	0.37	14.5	4	4	4	7
RH HYBRID	S	62.3	34.7	44	4	1.52	13.7	72	3	69.4	0.32	13.0	5	4	4	6
RH LINE 31	S	61.9	33.4	36	4	1.50	13.5	58	3	71.1	0.30	13.0	5	4	4	5
RH LINE 32	S	60.5	34.1	47	2	1.52	14.2	52	4	69.9	0.30	13.6	5	4	4	5
SD 2380	S	63.1	36.2	49	2	1.49	14.3	72	4	68.5	0.34	13.7	5	4	4	5
SD 2999	S	61.0	35.3	44	2	1.53	14.4	66	4	67.0	0.31	13.8	4	3	3	6
SD 3000	S	62.0	36.1	45	1	1.53	14.1	74	4	67.4	0.33	12.8	4	3	3	5
SD 3005	S	61.9	35.4	50	2	1.54	15.2	63	4	67.5	0.30	14.5	4	4	4	5
SD 8052-1	S	62.1	35.7	50	2	1.48	14.2	83	4	69.4	0.35	13.2	5	4	4	5
WA 7301	S	60.3	35.3	53	2	1.51	13.6	69	3	70.6	0.27	12.8	5	3	3	6
WA 7328	S	60.5	42.2	63	3	1.45	13.5	70	3	72.2	0.27	12.5	5	3	3	5
WA 7329	S	60.4	41.1	57	3	1.51	13.9	72	3	70.3	0.33	12.9	5	3	3	6

STATE=. STATION=WESTERN AREA NURSERY=ILEND

STATE=. STATION=WESTERN AREA NURSERY=ILEND

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## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=LANGDON NURSERY=UNIFORM

TABLE 7

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT SM %	WHT PRO %	HARDNESS %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR %	MILL SCORE ***	MIX ABS	MIX PAT
														%	%
BUTTE 86	S	61.1	35.7	66	1	1.71	15.6	80	4	61.7	0.56	14.4	3	67.0	4
CHRIS	S	58.6	29.2	31	3	1.69	15.8	77	4	58.9	0.58	15.4	3	66.3	5
ERA	S	58.1	28.7	26	3	1.70	13.3	69	3	59.4	0.69	12.0	3	61.0	4
MARQUIS	S	58.2	27.5	22	3	1.85	14.6	53	3	56.6	0.69	14.2	3	63.5	4
STOA	S	58.9	31.4	32	2	1.74	15.0	70	4	57.1	0.53	14.4	3	64.7	6
FA 384-384	S	62.6	36.0	63	0	1.72	15.0	79	4	59.6	0.62	14.3	3	65.0	4
HS 84-41	S	58.6	36.6	54	2	1.83	14.2	77	4	61.9	0.61	13.2	3	63.5	5
HS 84-692	S	58.9	30.6	36	3	1.79	13.5	64	3	62.3	0.58	12.2	3	61.9	4
HS 84-700	S	57.7	33.0	47	3	1.83	13.9	60	3	61.9	0.60	13.0	3	63.5	5
HS 84-873	S	59.6	34.6	57	2	1.64	13.4	64	3	62.8	0.55	12.0	3	60.7	5
MN 81110	S	58.3	34.7	59	0	1.79	14.9	61	4	55.1	0.63	14.4	3	66.0	5
MN 82047	S	59.4	33.6	55	2	1.76	12.8	74	2	63.9	0.59	11.4	3	60.9	4
MN 82354	S	59.1	34.2	57	1	1.70	14.5	63	4	62.4	0.45	14.0	3	62.8	3
MN 84056	S	59.0	32.5	55	2	1.80	13.4	59	3	57.4	0.57	12.5	3	60.0	5
MN 84662	S	60.4	37.7	62	1	1.86	15.3	82	4	60.4	0.55	14.1	3	64.2	3
MT 8336	S	59.4	31.1	12	2	1.77	14.2	63	4	59.7	0.47	13.6	3	64.4	6
MT 8446	S	61.7	34.8	47	1	1.72	14.1	59	4	59.3	0.52	12.9	3	64.2	7
ND 606	S	59.9	33.6	50	2	1.54	14.4	90	4	61.3	0.49	13.1	3	64.2	4
ND 618	S	59.1	30.5	23	3	1.84	15.8	76	4	57.8	0.53	15.3	3	65.0	5
ND 622	S	61.6	33.4	58	1	1.67	14.5	64	4	57.8	0.47	14.0	3	65.0	5
ND 626	S	61.3	38.9	77	1	1.66	15.2	76	4	64.2	0.47	14.1	4	64.7	5
ND 640	S	61.5	34.1	55	1	1.69	16.4	68	4	61.8	0.46	15.9	3	65.0	7
PR 2385	S	60.6	31.4	47	1	1.65	14.5	67	4	58.3	0.47	13.9	3	66.3	7
RH HYBRID	S	57.4	32.1	53	2	1.67	13.6	42	3	61.9	0.49	13.1	3	61.9	5
RH LINE 31	S	60.0	34.7	39	3	1.79	12.9	60	2	63.2	0.52	12.1	3	60.7	3
RH LINE 32	S	60.8	32.8	40	2	1.76	13.3	53	3	63.3	0.47	12.3	3	62.3	4
SD 2380	S	62.5	36.9	65	1	1.73	15.0	58	4	61.0	0.42	14.4	3	66.6	4
SD 2392	S	60.0	33.9	59	1	1.76	15.9	63	4	58.1	0.53	14.6	3	66.6	6
SD 3060	S	61.0	37.1	67	1	1.80	13.8	66	3	59.7	0.49	12.7	3	62.3	3
SD 3001	S	60.2	31.2	51	1	1.02	15.6	48	4	59.0	0.47	15.3	3	66.0	6
SD 8052	S	60.2	33.8	49	1	1.70	14.1	73	4	61.4	0.54	13.1	3	63.2	5
SD 73001	S	58.1	34.0	58	2	1.70	13.3	59	3	62.1	0.48	12.9	3	62.5	4
SD 7329	S	58.4	37.2	59	2	1.02	14.9	63	4	60.1	0.50	13.1	3	62.5	4
WA 7329	S	57.4	37.9	56	1	1.03	14.3	56	4	57.6	0.56	12.6	3	63.2	5

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NOERTH DAKOTA STATION=LANGDON NURSEY=UNIFORM

TABLE 7 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	GRAIN VOL	LOAF SCORE CC	BAKE SCORE CC	GENERAL SCORE ***	TW KW SM WP EX A65 FP MC MX BA MT DC CG LV						
										DEFICIENCIES	TW	SH	WF	EX	A65	FP
BUTTE 86	S	67.0	3.50	8	99	4	88	3	180	3	3.3	MI	MI	MI	MI	MI
CHRIS	S	66.3	3.00	6	100	7	87	4	168	3	3.3	MI	MI	MI	MI	MI
ERA	S	61.0	5.00	7	100	4	86	4	182	2	2.0	MJ	MJ	MJ	MJ	MJ
MARQUIS	S	63.5	3.00	8	100	4	87	4	185	3	2.3	MI	MI	MI	MI	MI
STOA	S	64.7	4.75	8	100	7	89	6	184	4	3.3	MI	MI	MI	MI	MI
FA 984-384	S	65.0	3.00	9	100	4	88	4	192	3	3.0	MJ	MJ	MJ	MJ	MJ
HS 84-41	S	63.5	4.75	8	100	7	90	11	183	4	3.3	MI	MI	MI	MI	MI
HS 84-692	S	61.9	3.50	9	101	4	86	4	193	2	2.0	MI	MI	MI	MI	MI
HS 84-700	S	63.5	4.50	9	100	4	88	4	184	3	3.0	MI	MI	MI	MI	MI
HS 84-873	S	60.7	4.50	9	100	4	87	4	196	2	2.0	MI	MI	MI	MI	MI
MN 811110	S	66.0	4.50	9	100	4	88	6	206	4	3.0	MJ	MJ	MJ	MJ	MJ
MN 82047	S	60.3	3.75	9	100	4	87	4	202	1	1.9	MJ	MI	MI	MI	MI
MN 82354	S	62.8	3.00	7	101	4	88	6	177	4	2.0	MI	MI	MI	MI	MI
MN 84056	S	60.0	4.25	7	100	4	87	6	175	4	2.0	MI	MI	MI	MI	MI
MN 84662	S	64.2	2.75	9	100	6	87	4	199	2	2.0	MI	MI	MI	MI	MI
MT 8336	S	64.4	5.00	9	102	8	89	6	194	4	3.7	MI	MI	MI	MI	MI
MT 8446	S	64.2	5.75	9	101	8	89	6	195	3	3.0	MI	MI	MI	MI	MI
ND 606	S	64.2	3.00	7	100	6	87	5	180	4	3.7	MI	MI	MI	MI	MI
ND 618	S	65.0	4.00	8	99	4	85	4	183	3	3.0	MI	MI	MI	MI	MI
ND 622	S	65.0	3.50	8	100	7	87	6	181	3	3.4	MI	MI	MI	MI	MI
ND 626	S	64.7	4.00	9	101	7	90	13	200	4	4.0	MI	MI	MI	MI	MI
ND 640	S	65.0	4.50	9	100	8	85	4	198	3	3.3	MI	MI	MI	MI	MI
PR 2385	S	66.3	6.25	9	101	8	86	4	193	2	2.0	MI	MI	MI	MI	MI
RH HYBRID	S	61.9	4.75	9	102	4	88	6	220	3	2.0	MJ	MJ	MJ	MJ	MJ
RH LINE 31	S	60.7	3.25	9	100	7	88	6	184	3	2.0	MI	MI	MI	MI	MI
RH LINE 32	S	62.3	3.50	8	101	8	89	11	183	4	2.7	MI	MI	MI	MI	MI
SD 2980	S	66.6	3.00	8	101	8	87	4	177	3	2.9	MI	MI	MI	MI	MI
SD 2999	S	66.6	4.75	9	102	8	88	4	224	3	3.3	MI	MI	MI	MI	MI
SD 3000	S	62.3	4.50	8	101	8	88	6	179	4	3.0	MI	MI	MI	MI	MI
SD 3005	S	66.0	4.50	9	100	7	88	4	189	3	3.0	MI	MI	MI	MI	MI
SD 8052	S	63.2	4.25	7	100	6	87	4	172	3	3.3	MI	MI	MI	MI	MI
W 2501	S	62.9	4.00	9	100	4	87	4	192	3	2.3	MI	MI	MI	MI	MI
WA 7328	S	62.5	4.25	9	101	8	87	6	203	4	2.7	MI	MI	MI	MI	MI
WA 7329	S	65.2	3.50	8	101	7	87	4	187	3	3.3	MI	MI	MI	MI	MI

DEFICIENCIES TW SH WF EX A65 FP MC MX BA MT DC CG LV  
MINOR FAULTING VALUES 57.9 31.4 8 13.9 57.3 57.1 2.9 3 2,7,8 61.9 5.75-3.00 2.00-2.75 6 6 6 8 161  
MAJOR FAULTING VALUES 56.9 28.4 18 12.9 55.3 55.1 12.4 2 1,9,11 60.4 UNDER 1.75 OVER 8.00 4 3 4 151

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=WYOMING STATION=POWELL NURSERY=UNIFORM

TABLE 8

VARIETY	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SM %	ASH %	WHT PRO ***	WHT NESS %	HAED-NESS %	WHEAT EXT %	FLR 65%EX %	ASH @ 65%EX %	FLR PRO %	MILL CHAR %	MILL SCORE ***	MILL ABS %	MIX ABS %	MIX FAT %
BUTTE 86	6	65.0	35.8	72	0	1.71	11.1	68	2	62.6	0.42	10.8	3	1	1	1	1
CHRIS	6	63.9	36.9	54	2	1.62	11.7	75	2	61.6	0.47	11.3	3	1	1	1	1
ERA	6	65.0	39.1	68	2	1.57	10.0	75	2	66.1	0.47	9.0	4	2	2	2	2
MARQUIS	63.1	45.0	72	2	1.69	11.1	72	2	64.3	0.59	10.6	4	2	2	2	2	2
OLAF	62.8	41.2	85	0	1.74	11.7	68	2	66.4	0.46	11.2	4	2	2	2	2	4
FA 984-384	65.4	46.7	78	1	1.71	11.5	74	2	63.7	0.51	11.0	3	1	1	1	1	1
HS 84-41	63.4	46.3	79	2	1.65	10.8	75	2	64.7	0.49	10.0	4	2	2	2	2	7
HS 84-692	63.3	37.9	75	2	1.65	11.1	66	2	65.6	0.54	10.2	4	2	2	2	2	3
HS 84-700	64.0	40.3	79	2	1.65	10.4	69	2	67.9	0.70	9.5	4	1	1	1	1	3
HS 84-873	63.5	42.7	84	1	1.58	10.5	72	2	66.2	0.49	9.5	4	2	2	2	2	3
MN 81110	63.8	44.1	86	1	1.64	11.0	70	2	64.5	0.52	10.6	4	2	2	2	2	9
MN 82047	63.2	41.8	79	2	1.60	10.2	63	2	67.3	0.47	9.4	4	2	2	2	2	5
MN 82354	62.2	42.7	82	1	1.60	11.2	57	2	65.6	0.39	10.8	4	2	2	2	2	0
MN 84056	63.8	41.7	80	2	1.72	11.0	65	2	65.7	0.48	10.5	4	2	2	2	2	0
MN 84662	64.4	45.0	80	2	1.65	11.4	74	2	62.2	0.43	10.5	3	1	1	1	1	3
MT 8336	65.1	45.0	84	0	1.53	10.7	72	2	63.5	0.38	10.0	3	1	1	1	1	3
MT 8446	64.8	43.3	82	1	1.55	10.9	68	2	61.1	0.48	9.9	3	1	1	1	1	3
ND 606	63.0	38.6	67	2	1.59	11.0	83	2	65.0	0.49	10.0	4	2	2	2	2	3
ND 618	63.8	36.9	62	1	1.62	10.8	77	2	64.4	0.46	10.3	4	2	2	2	2	3
ND 622	64.3	38.0	70	0	1.67	11.5	69	2	62.5	0.40	11.2	3	1	1	1	1	8
ND 626	64.1	42.7	82	1	1.62	11.2	75	2	65.0	0.46	10.4	4	2	2	2	2	3
ND 640	62.7	36.8	59	0	1.62	11.8	66	2	63.9	0.46	11.3	3	1	1	1	1	7
ND 850422	64.5	41.5	70	2	1.60	10.3	68	2	66.7	0.46	9.5	4	2	2	2	2	3
ND 850522	65.0	39.4	68	2	1.67	10.3	59	2	66.4	0.40	9.6	4	2	2	2	2	7
PR 2369	65.0	40.2	70	2	1.61	10.8	74	2	65.9	0.47	10.0	4	2	2	2	2	9
PR 2385	62.6	30.2	61	1	1.62	11.6	73	2	62.3	0.51	10.9	3	1	1	1	1	7
RS 848254	62.9	41.0	80	1	1.55	10.2	54	2	65.6	0.42	9.8	4	2	2	2	2	6
SD 2900	64.8	40.8	75	1	1.59	11.6	71	2	63.4	0.45	10.9	3	1	1	1	1	8
SD 2959	63.0	41.2	72	1	1.71	11.0	66	2	61.3	0.50	11.2	3	1	1	1	1	5
SD 3000	60.0	42.4	70	1	1.60	11.1	73	2	65.0	0.50	9.8	4	2	2	2	2	6
SD 3005	64.4	40.8	75	2	1.63	12.1	60	2	63.3	0.45	11.7	3	1	1	1	1	8
SD 8052	60.3	39.0	78	1	1.60	11.1	71	2	65.0	0.51	10.0	4	2	2	2	2	0
WA 7323	63.3	44.6	69	3	1.70	10.2	69	2	65.1	0.49	9.1	4	2	2	2	2	7

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

TABLE 8 (Cont.)

VARIETY	STATE=WYOMING	STATION=POWELL	DEFICIENCIES-										GENERAL SCORE ***	TW KW SM WF EX A65 FP MC MX BA MT DC CC CG LV
			BAKE ABS %	MIX STD %	DOUGH TIME MIN	CHAR COLOR	CRUMB GRAIN VOL	LOAF VOL	BAKE SCORE	GENERAL SCORE	TW KW SM WF EX A65 FP MC MX BA MT DC CC CG LV			
BUTTE 86	S	S	61.6	2.25	5	102 4	86	1	153	1	1.3	MJ MJ MI MI MI MI MI MJ MJ MJ MJ MJ MJ MJ MJ		
CHRIS	S	S	61.9	2.50	6	101 8	89	8	164	2	1.7	MJ MJ MI MI MI MI MJ MJ MJ MJ MJ MJ MJ MJ MJ		
ERA	S	S	59.0	3.00	5	100 4	85	1	146	1	1.7	MJ MJ MI MJ		
MARQUIS	S	S	60.0	2.50	7	101 8	87	5	176	1	1.7	MJ		
OLAF	S	S	61.0	3.50	5	100 6	86	3	147	2	2.0	MJ		
FA 984-384	S	S	60.0	2.00	5	100 4	85	1	163	1	1.3	MJ		
HS 84-41	S	S	60.7	3.00	5	101 4	86	1	156	2	2.0	MJ		
HS 84-692	S	S	60.3	2.00	7	101 6	88	4	179	1	1.7	MJ		
HS 84-700	S	S	59.3	2.25	6	102 6	86	3	153	1	1.3	MJ		
HS 84-873	S	S	58.3	2.50	6	100 7	86	4	159	1	1.7	MJ		
MN 31110	S	S	61.9	2.75	8	100 4	88	6	186	2	2.0	MJ		
MN 82047	S	S	57.5	2.25	5	100 6	87	5	162	1	1.7	MJ		
MN 82354	S	S	59.0	2.00	6	101 4	88	6	172	1	1.7	MJ		
MN 84056	S	S	60.0	2.00	6	102 8	87	4	168	1	1.7	MJ		
- MN 84662	S	S	61.3	1.75	5	101 6	88	12	157	1	1.3	MJ		
- MT 8336	S	S	61.3	3.25	5	102 8	87	7	143	3	2.0	MJ		
MT 8446	S	S	61.3	4.00	2	102 7	87	7	135	1	1.3	MJ		
ND 606	S	S	61.3	2.50	2	100 6	88	8	149	1	1.7	MJ		
ND 618	S	S	60.3	2.25	6	101 6	88	6	166	1	1.7	MJ		
ND 622	S	S	62.8	2.25	8	101 8	88	4	190	2	1.7	MJ		
ND 626	S	S	60.3	2.75	7	101 7	89	8	173	1	1.7	MJ		
ND 640	S	S	60.7	2.75	6	101 4	86	3	160	1	1.3	MJ		
ND 850422	S	S	59.3	2.25	5	100 4	88	4	156	1	1.7	MJ		
ND 850522	S	S	59.7	2.00	7	102 8	88	4	181	1	1.7	MJ		
PR 2369	S	S	61.9	3.25	6	103 9	87	3	164	2	2.0	MJ		
PR 2385	S	S	64.7	3.25	7	102 8	87	8	169	4	2.3	MJ		
RS 848254	S	S	59.0	3.00	6	103 5	89	6	166	2	2.0	MJ		
SD 2980	S	S	62.8	2.00	7	103 9	87	3	169	2	1.7	MJ		
SD 2990	S	S	62.5	1.50	7	103 9	89	6	180	2	1.7	MJ		
SD 3000	S	S	61.6	2.50	5	102 4	87	4	151	1	1.7	MJ		
SD 3005	S	S	62.9	2.25	3	103 9	88	4	179	2	1.7	MJ		
SD 8052	S	S	62.7	2.25	6	100 6	88	6	162	2	2.0	MJ		
Wa 7323	S	S	58.7	2.75	5	101 6	88	5	156	1	1.7	MJ		

DEFICIENCIES TW SM WF EX AG5 FP MC MX BA MT DC CC CG LV  
MINOR FAULTING VALUES 57.9 35.3 8 13.9 62.2 .57 12.9 3 27.8 61.9 5.75-8.00 2.00-2.75 6 6 8 129  
MAJOR FAULTING VALUES 56.9 32.3 10 12.9 60.2 .61 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 0.00 4 3 4 119

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=MONTANA STATION=HARVE NURSERY=UNIFORM

TABLE 9

VARIETY	STD #/BU	TEST WT	1000 K.WT	SIZING Lg	WHT ASH	HARD- NESS	WHEAT PRO	FLR EXT	ASH @ 65%EX	FLR PRO	MILL CHAR	MILL SCORE	MIX ABS	MIX FAT
		%	%	%	%	%	%	***	%	%	***	***	%	%
LEN PR 2369	S	62.3	35.4	64	1	1.62	15.5	72	4	70.7	0.40	15.3	5	4
		58.8	29.7	14	2	1.54	16.0	74	3	61.0	0.40	15.1	3	1

LEN  
PR 2369

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=MONTANA STATION=HARVE NURSERY=UNIFORM

VARIETY	STD #/BU	BAKE ABS	MIX TIME	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL	BAKE SCORE	GENERAL SCORE	DEFICIENCIES																	
		%	MIN	MIN	MIN	MIN	CC	***	***	TW	KW	SM	WF	EX	AES	FP	MT	MX	PA	MIX TIME	MT	DC	CC	MI	MJ	MI	MJ
LEN PR 2369	S	67.6	6.25	9	100	4	87	4	187	2	3.3																
		70.3	7.00	4	100	7	88	6	197	1	1.7																

LEN  
PR 2369

DEFICIENCIES TW SW SM WF EX AES FP MT MX PA MIX TIME MT DC CC MI MJ MI MJ MI MJ LV

MINOR FAULTS VALUES 57.9 33.3 8 13.9 68.0 .57 12.9 3 21.7.9 61.9 5.75 3.00 2.00 +2.75 6 6 9 16.6

MAJOR FAULTS VALUES 56.9 30.3 10 12.9 60.6 .61 12.4 2 17.9-11 60.4 HOLLOW 1.75 OVER 0.00 4 2 4 16.6

\*\*\* 1: NO PROFOUND 2: LITTLE PROFOUND 3: SOME PROFOUND 4: MODERATE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=WILLISTON NURSERY=UNIFORM

TABLE 10

VARIETY	STD WT #/BU	TEST		1000 K.WT G.		SIZING		WHT ASH %		HARD- NESS %		WHEAT SCORE **		FLR EXT %	ASH EX %	FLR CHAR %	MILL CHAR ***	MILL CHAR ***	MIX ABS %	MIX ABS %
		WT	K.WT	LBS	SM	ASH	FWD	NESS	SCORE	FLR	ASH	FLR	CHAR	CHAR	CHAR	CHAR	CHAR	FAT		
LEN	S	62.3	35.4	64	1	1.62	15.5	72	4	70.7	0.40	15.3	5	4	67.6	7				
GAP 5	61.0	30.8	27	2	1.42	15.9	71	4	59.8	0.44	15.6	3	1	66.6	4					
LEN	62.5	35.8	59	1	1.40	17.1	75	4	63.0	0.43	16.1	3	1	68.2	8					

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=WILLISTON NURSERY=UNIFORM

VARIETY	STD WT %	BAKE		MIX		DOUGH		CRUMB		CRUMB		LOAF		BAKE		GENERAL		DEFICIENCIES										
		BAKE ABS %	TIME MIN	MIX ABS %	TIME CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL	LOAF GRAIN	BAKE VOL	BAKE GRAIN	GENERAL SCOR	GENERAL SCOR	GENERAL SCOR	GENERAL SCOR	TW	KW	SM	WF	EX	A65	FP	MC	MX	BA	MT	DC	CC
LEN	S	67.6	6.25	9	100	4	87	4	187	2	3.3																	
GAP 5	66.6	2.75	8	100	7	88	6	183	3	2.7																		
LEN	63.2	7.25	9	101	6	87	4	212	2	2.3																		

DEFICIENCIES	TW	FW	SM	WP	EX	AGS	TR	MC	MX	LA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA
LEN	57.9	32.9	0	13.9	60.6	.57	12.9	3	2.7	0	61.9	5.75	0.00	2.00	-2.75	6	6	MI	LV	166								
GAP 5	56.9	30.9	10	17.9	66.6	.61	12.4	2	1.9	-11	60.4	1.75	OVER 0.00	1.75	OVER 0.00	4	3	MI	156									
LEN	56.9	30.9	10	17.9	66.6	.61	12.4	2	1.9	-11	60.4	1.75	OVER 0.00	1.75	OVER 0.00	4	3	MI	156									

\* \* \* 1=NO PROMISE 2=LITTLE PROMISE 3-SOME PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=CARRINGTON NURSERY=UNIFORM

TABLE 11

VARIETY	STD	TEST	1000	SIZING	WHT	HARD-	WHEAT	FLR	ASH @	FLR	MILL	MIX	MIX	
		WT	K.WT	LG	SM	ASH	FRO	NESS	SCORE	EXT	FRO	CHAR	ADS	FAT
		#/BU	G.	%	%	%	%	%	***	%	%	***	%	%
LEN PP 2369	S	62.3	35.4	6.4	1	1.62	15.5	72	4	70.7	0.40	15.3	5	4
		59.4	31.4	29	3	1.81	14.8	59	4	58.3	0.54	14.6	3	1

LEN S 62.3 35.4 6.4 1 1.62 15.5 72 4 70.7 0.40 15.3 5 4  
PP 2369 59.4 31.4 29 3 1.81 14.8 59 4 58.3 0.54 14.6 3 1

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=CARRINGTON NURSERY=UNIFORM

VARIETY	STD	BAKE	MIX	DOUGH	CRUMB	CRUMB	BAKE	GENERAL	DEFICIENCIES					
		ABS	TIME	CHAR	COLOR	GRAIN	LOAF	SCORE	TW	KW	SM	WF	EX	A65 FP MC MX BA MT DC CC OG LV
		%	MIN			VOL	CC	***	***	***	***	***	***	***
LEN PP 2369	S	67.6	6.25	9	100	4	87	4	187	2	3.3			
		67.6	4.00	9	100	3	88	6	215	4	3.0			

LEN S 67.6 6.25 9 100 4 87 4 187 2 3.3  
PP 2369 67.6 4.00 9 100 3 88 6 215 4 3.0

DEFICIENCIES TW KW SM WF EX A65 FP MC MX BA MT DC CC OG LV  
TW, K, F, A65, F, M, C, O, G, L  
DEFICIENCIES TW KW SM WF EX A65 FP MC MX BA MT DC CC OG LV  
TW, K, F, A65, F, M, C, O, G, L

\*\*\* NO PREFERENCE TO LITTLE PREFERENCE GOOD PERFORMANCE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=WYOMING STATION=SHERIDAN NURSERY=UNIFORM

TABLE 12

VARIETY	TEST WT #/BU	STD G.	TEST 1000 K.WT		SIZING LG SM		WHT FRO	HARDNESS %	WHEAT SCORE **%	FLR EXT %	ASH @ 65% EX %	FLR PRO %	MILL CHAR %	MILL SCORE ***%	MILL ABS %	MIX FAT %
			WT	K.WT	LG	SM										
LEN	S	62.3	35.4	64	1	1.62	15.5	72	4	70.7	0.40	15.3	5	4	67.6	7
IDO 266	S	62.6	31.3	24	2	1.31	12.9	20	2	54.8	0.36	12.0	2	1	61.3	1
ND 850422	S	61.4	31.9	22	3	1.51	14.1	63	4	70.1	0.39	13.3	5	4	63.2	3
ND 850522	S	61.4	32.7	19	3	1.45	14.1	58	4	67.9	0.40	13.7	4	3	64.2	4
PR 2369	S	60.5	33.8	33	2	1.41	15.1	74	4	66.8	0.40	14.8	4	3	66.6	6
FS 848254	S	59.0	30.6	26	3	1.39	15.1	40	4	64.2	0.40	14.4	4	2	64.2	6
SD 2990	S	59.0	33.1	34	2	1.46	15.4	63	4	62.6	0.43	15.2	3	1	65.7	4

QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=WYOMING STATION=SHERIDAN NURSERY=UNIFORM

VARIETY	TEST ABS %	STD MIN	BAKE MIX TIME		DOUGH COLOR		CRUMB GRAIN VOL	LOAF VOL CC	BAKE SCORE ***%	GENERAL SCORE ***%	TW KW SM WF EX A65 FP MC MX BA MT DC CC CG LV				DEFICIENCIES						
			ABS %	MIN	CHAR	GRAIN					TW	KW	SM	WF	EX	A65	FP	MC	MX	BA	MT
LEN	S	67.6	6.25	9	100	4	37	4	137	2	3.3										
IDO 266	S	61.3	1.75	5	102	4	66	7	160	1	1.3										
ND 850422	S	63.2	3.00	3	101	6	37	4	179	3	3.7										
ND 850522	S	64.2	4.25	3	101	7	87	4	183	3	3.3										
PR 2369	S	66.6	4.75	9	101	8	90	12	211	4	3.7										
FS 848254	S	64.2	5.00	4	102	4	90	11	202	4	3.3										
SD 2990	S	65.7	7.50	9	101	7	99	12	195	4	3.0										

DEFICIENCIES	TW	KW	SM	WF	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV	MI	MJ	MI	MJ	MI
DEFICIENCIES	TW	KW	SM	WF	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV	MI	MJ	MI	MJ	MI
ND 850422	33.3	8	13.9	63.6	.57	12.9	3	2.7	8	61.9	5.75-8.00	2.00-2.75	6	6	6	9	16.6			
ND 850522	30.3	10	12.9	66.6	.61	12.4	2	1.9-11	60.4	UNDFTD	1.75	OVER	0.00	4	3	4	15.6			

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=WASHINGTON STATION=FULLMAN NURSEY=UNIFORM

TABLE 13

VARIETY	STD #/BU	TEST WT			SIZING			WHT FEO			WHEAT NESS			FLR 65% EX			ASH & FRO			MILL CHAR SCORE			MIX ABS %		
		LBS.	% WT	LB	SM	ASH	FEO	NESS	SCORE ***	%	EXT	65% EX	FRO	CHAR ***	%	ASH & FRO	CHAR ***	%	MILL SCORE ***	CHAR ***	MIX ABS %				
LEN	S	62.3	35.4	64	1	1.62	15.5	72	4	70.7	0.40	15.3	5	4	67.6	7									
COFFER		58.6	27.2	4	4	1.59	14.0	64	3	64.5	0.39	13.6	4	2	64.2	8									
SPILLMAN		59.0	30.0	8	3	1.57	14.3	74	3	63.7	0.45	13.9	3	1	61.6	4									
WA 7330		59.0	29.6	10	4	1.64	14.2	74	3	63.3	0.49	13.8	3	1	63.5	5									
WFB 906		59.3	30.7	16	3	1.61	15.4	65	4	60.2	0.41	15.1	3	1	63.8	8									

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=WASHINGTON STATION=FULLMAN NURSEY=UNIFORM

VARIETY	STD %	BAKE ABS			DOUGH MIN			CRUMB COLOR			CRUMB GRAIN			LOAF VOL			BAKE GENERAL SCORE			DEFICIENCIES--TW KW SM WP EX AES FP MC MX BA MT DC CC CG LV		
		BAKE	MIX	DOUGH	CRUMB	CHAR	COLOR	GRAIN	LOAF	VOL	BAKE	GENERAL	SCORE	***	***	***	***	***	***	***	***	
LEN	S	67.6	6.25	9	100	4	87	4	187	2	3.3											
COFFER		64.2	7.00	4	102	8	88	8	185	1	2.0											
SPILLMAN		61.6	4.00	3	101	6	88	6	200	3	2.3											
WA 7330		63.5	4.00	8	102	7	89	12	189	4	2.7											
WFB 906		63.8	6.00	8	102	8	87	6	186	3	2.7											

DEFICIENCIES	TW	KW	SM	WP	EX	AES	FP	MC	MX	BA	MT	DC	CC	CG	LV	DEFICIENCIES	TW	KW	SM	WP	EX	AES	FP	MC	MX	BA	MT	DC	CC	CG	LV
LEN	S	67.6	6.25	9	100	4	87	4	187	2	3.3																				
COFFER		64.2	7.00	4	102	8	88	8	185	1	2.0																				
SPILLMAN		61.6	4.00	3	101	6	88	6	200	3	2.3																				
WA 7330		63.5	4.00	8	102	7	89	12	189	4	2.7																				
WFB 906		63.8	6.00	8	102	8	87	6	186	3	2.7																				

DEFICIENCIES	TW	KW	SM	WP	EX	AES	FP	MC	MX	BA	MT	DC	CC	CG	LV	DEFICIENCIES	TW	KW	SM	WP	EX	AES	FP	MC	MX	BA	MT	DC	CC	CG	LV
LEN	S	67.6	6.25	9	100	4	87	4	187	2	3.3																				
COFFER		64.2	7.00	4	102	8	88	8	185	1	2.0																				
SPILLMAN		61.6	4.00	3	101	6	88	6	200	3	2.3																				
WA 7330		63.5	4.00	8	102	7	89	12	189	4	2.7																				
WFB 906		63.8	6.00	8	102	8	87	6	186	3	2.7																				

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3-SOME PROMISE 4=GOOD PROMISE

DEFICIENCIES TW KW SM WP EX AES FP MC MX BA MT DC CC CG LV

DEFICIENCIES TW KW SM WP EX AES FP MC MX BA MT DC CC CG LV

DEFICIENCIES TW KW SM WP EX AES FP MC MX BA MT DC CC CG LV

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=FARGO NURSERY=FIELD PLOTS

TABLE 14

VARIETY	STD # / BU	TEST WT K.WT	1,000 SIZING L.G G.	WHT SM %	WHT ASH %	HARD- NESS %	WHEAT SCORE ***	FLR EXT %	ASH @ %	FLR PRO %	MILL CHAR **	MILL SCORE ***	MIX ABS %	MIX P&T %		
ALEX		63.1	33.4	43	1	1.60	15.5	71	4	69.4	0.33	14.3	4	4	66.6	5
BUTTE 86		61.6	35.2	60	1	1.46	15.3	85	4	68.8	0.33	14.0	4	3	67.0	5
COTEAU	S	62.3	32.3	33	2	1.63	15.6	83	4	69.7	0.36	14.5	4	4	67.6	5
LEN		62.6	38.3	68	2	1.51	14.9	74	4	71.3	0.34	13.8	5	4	65.0	6
MARSHALL	S	63.1	31.9	39	0	1.58	13.7	63	3	72.3	0.35	12.7	5	3	62.8	3
STOA		61.5	33.6	38	2	1.50	14.9	73	4	70.5	0.33	13.8	5	4	66.6	6
WALDRON		60.4	32.9	35	1	1.61	15.2	77	4	69.2	0.37	13.5	4	4	64.2	6

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=FARGO NURSERY=FIELD PLOTS

VARIETY	STD %	BAKE ABS	MIX TIME	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL	BAKE SCORE	GENERAL SCORE	DEFICIENCIES--	TW KW SM WP EX A65 FP MC MX BA MT DC CC CG LV				
ALEX		67.5	4.00	9		100	7	87	7	950	4	4.0	MI	MI	MI
BUTTE 86		67.1	3.75	9		100	7	90	11	910	3	3.3	MI	MI	MI
COTEAU	S	67.8	3.50	9		100	4	86	3	1030	3	3.7	MI	MI	MI
LEN		65.7	5.00	9		99	4	87	7	975	4	4.0	MI	MI	MI
MARSHALL	S	63.0	2.75	8		100	7	88	7	910	2	2.7	MI	MI	MI
STOA	S	66.8	4.75	9		100	6	87	3	965	3	3.7	MI	MI	MI
WALDRON		64.4	3.75	8		100	7	88	6	905	3	3.7	MI	MI	MI

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)	DC	CC	CG	LV
MINOR FAULTING VALUES:	57.9	33.8	8	13.9	68.0	.47	12.9	3	2,7,0	61.9	5.75-8.00	2.00-2.75	6	6	915
MAJOR FAULTING VALUES:	56.9	30.8	18	12.9	66.0	.1	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	865

AAA 1 NO PROMISE 2 LITTLE PROMISE 3 SOME PROMISE 4 GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES

1987 CROP

STATE=NORTH DAKOTA STATION=MINOT NURSERY=FIELD FLOTS

TABLE 15

VARIETY	STD	#/BU	TEST	1000	SIZING	WHT	HARD-	WHEAT	FLR	ASH @	MILL	MIX				
			WT	K.WT	LG	SM	ASH	FRO	NESS	SCORE	EXT	65%EX	FRO	CHAR	SCORE	MIX ABS
			%	%	%	%		***	%	%	%	%	%	***	%	%
ALEX		62.7	32.6	40	0	1.47	15.2	79	4	69.4	0.35	14.1	4	4	66.6	7
COTEAU		60.8	30.7	14	1	1.46	16.5	95	4	68.9	0.35	15.3	4	4	69.4	7
LEN	S	62.1	35.8	56	0	1.37	15.3	76	4	71.5	0.33	14.6	5	4	67.3	9
MAFSHALL		61.9	31.3	36	0	1.44	14.3	68	4	72.2	0.27	13.6	5	4	64.7	5
STOA	S	61.8	31.1	19	0	1.35	14.8	81	4	69.4	0.35	14.0	4	4	67.6	8
WALDRON		60.6	33.2	47	0	1.45	16.0	77	4	68.9	0.35	14.7	4	4	67.0	6

## QUALITY DATA OF SPRING WHEAT SAMPLES

1987 CROP

STATE=NORTH DAKOTA STATION=MINOT NURSERY=FIELD FLOTS

VARIETY	STD	#%	BAKE	MIX	DOUGH	CRUMB	CRUMB	BAKE	GENERAL	DEFICIENCIES-															
			ABS	TIME	CHAR	COLOR	GRAIN	VOL	SCORE	TW	KW	SM	WF	EX	A65	FF	MC	MX	BA	MT	DC	CC	CG	LV	
			%						***																
ALEX		67.3	5.00	9		100	7	88	6	935	4														
COTEAU		70.0	4.25	8		100	4	89	11	920	4														
LEN	S	68.2	7.25	9		100	4	86	3	990	1														
MAFSHALL		65.7	3.75	9		100	7	87	11	915	4														
STOA	S	68.2	4.50	9		100	7	88	6	875	3														
WALDRON		67.8	4.50	9		100	7	87	4	925	3														

ALEX	67.3	5.00	9		100	7	88	6	935	4														
COTEAU	70.0	4.25	8		100	4	89	11	920	4														
LEN	S	68.2	7.25	9		100	4	86	3	990	1													
MAFSHALL		65.7	3.75	9		100	7	87	11	915	4													
STOA	S	68.2	4.50	9		100	7	88	6	875	3													
WALDRON		67.8	4.50	9		100	7	87	4	925	3													

DEFICIT IN %  
MINOR FAULTING VALUES 5/.7  
MAJOR FAULTING VALUES 56/.9  
TEST WT 6.9  
SH 31.3  
W 1.3  
FRO 0.3  
ASH 13.9  
SM 12.9  
LNG 12.9  
GRN 12.9  
TW 5.75  
KW 6.1  
SM 7.8  
WF 12.9  
EX 12.9  
A65 2.75  
FF 2.00  
MC 2.75  
MX 2.75  
BA 6.1  
MT 6.1  
DC 6.1  
CC 6.1  
CG 6.1  
LV 6.1  
DEFICIT IN %  
MINOR FAULTING VALUES 5/.7  
MAJOR FAULTING VALUES 56/.9  
TEST WT 6.9  
SH 31.3  
W 1.3  
FRO 0.3  
ASH 13.9  
SM 12.9  
LNG 12.9  
GRN 12.9  
TW 5.75  
KW 6.1  
SM 7.8  
WF 12.9  
EX 12.9  
A65 2.75  
FF 2.00  
MC 2.75  
MX 2.75  
BA 6.1  
MT 6.1  
DC 6.1  
CC 6.1  
CG 6.1  
LV 6.1

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

TABLE 16 STATE=NORTH DAKOTA STATION=LANGDON NURSEY=FIELD PLOTS

VARIETY	TEST WT #/BU	SIZING			WHT PRO	HARDNESS	WHEAT SCORE	FLR EXT 65%EX	ASH %	FRO %	CHAR %	FLR MILL	MILL SCORE	MIX ABS	MIX FAT %
		K.WT %	LG %	SM %											
ALEX	59.3	31.0	32	2	1.91	15.6	67	4	67.4	0.40	14.8	3	3	67.6	6
COTEAU	57.8	27.5	14	3	1.91	16.5	61	4	69.2	0.42	15.6	4	4	69.7	6
LEN	59.1	29.8	42	2	1.83	15.8	61	4	70.2	0.37	14.6	5	4	66.3	8
MARSHALL	57.8	24.4	11	4	1.86	14.6	59	4	69.4	0.34	13.5	4	4	63.5	4
STOA	56.9	26.2	16	3	1.88	16.3	67	3	67.3	0.39	15.3	4	4	67.9	6
WALDRON	56.3	28.7	38	2	1.92	16.1	62	3	67.3	0.43	15.0	4	4	66.0	4

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=NORTH DAKOTA STATION=LANGDON NURSEY=FIELD PLOTS

VARIETY	TEST STD %	BAKE ABS			DOUGH MIN	CRUMB COLOR	GRAIN VOL	LOAF GRAIN CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES														
		MIX	TIME	CHAR							TW	KW	SM	WF	EX	A65	FF	MC	MX	BA	MT	DC	CC	GS	LV
ALEX	68.3	3.75	9	100	7	88	4	1050	3	3	3.3														
COTEAU	70.5	3.25	9	100	7	88	4	1000	3	3	3.7														
LEN	66.9	5.00	9	10	4	87	7	960	4	4	4.0														
MARSHALL	64.1	3.00	9	100	4	88	7	910	3	3	3.7														
STOA	68.7	4.25	9	100	7	88	6	990	4	4	3.7														
WALDRON	67.1	3.50	9	100	7	83	11	900	3	3	3.3														

DISTRIBUTION  
MINOR FAILURES VALUES 37.7 25.9 57.9 32.9  
MAJOR FAILURES VALUES 56.9 22.9 64.6 12.9  
\* \* \* 1=NO PROMISE 2=A LITTLE PROMISE 3=MEDIUM PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=CALIFORNIA STATION=IMPERIAL VALLEY NURSERY=FIELD PLOTS

TABLE 17

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT ASH %	HARD- NESS %	WHEAT SCORE ***	FLR 65%EX %	ASH @ EXT %	FLR PRO %	MILL CHAR ***	MIX ABS %	MIX PAT %	
												ABS	PAT	
PROBRAND 775		62.7	36.9	25	2	1.62	12.0	78	1	71.6	0.41	10.9	5	2
TAMI		64.3	49.5	69	0	1.66	13.2	89	3	71.4	0.38	11.8	5	2
WESTBRED 911		63.5	39.2	56	1	1.52	11.6	87	2	67.7	0.43	10.2	4	1
YECORO ROJO	S	64.7	43.5	66	0	1.55	12.2	79	2	70.4	0.38	10.8	5	2
E 628		65.2	38.5	43	1	1.53	10.9	79	2	70.7	0.38	9.6	5	2
E 638		64.0	37.2	51	1	1.57	11.8	67	1	72.3	0.37	10.5	5	2
E 683		64.3	36.4	49	2	1.45	10.9	97	1	64.2	0.44	9.7	3	1
E 702		65.7	40.5	64	1	1.52	13.0	91	3	68.7	0.37	11.6	4	2
E 703		64.7	39.7	60	1	1.56	12.4	86	2	68.2	0.40	10.9	4	1
E 705		63.5	42.2	78	0	1.60	11.6	87	2	70.2	0.46	10.8	5	2
E 749		65.0	33.6	21	2	1.57	11.5	73	1	71.6	0.35	10.5	5	2
E 750		64.4	33.9	30	0	1.47	11.6	89	1	65.1	0.43	10.3	3	1
PH 983-69		64.9	43.9	58	0	1.52	12.0	81	2	70.7	0.36	10.7	5	2
PH 984-75		63.5	38.2	41	3	1.61	11.9	70	1	71.4	0.40	10.8	5	2
												61.6	7	

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

STATE=CALIFORNIA STATION=IMPERIAL VALLEY NURSERY=FIELD PLOTS

TABLE 17 (Cont.)

VARIETY	STD	BAKE ABS %	DOUGH TIME MIN	CRUMB COLOR	CRUMB GRAIN	BAKE VOL CC	GENERAL SCORE ***	DEFICIENCIES-						
								TW	KW	SM	WP	EX	A65	FP
PROBRAND 775		64.7	4.00	6	100	7	88	6	825	4	2.3	MJ	MJ	MI
TAMI		67.9	2.50	7	100	7	89	6	900	3	2.7	MJ	MI	MI
WESTBRED 911	S	62.2	5.50	7	99	0	85	3	710	1	1.3	MJ	MJ	MJ
YECORO ROJO		63.2	5.50	8	100	8	89	12	820	4	2.7	MJ	MJ	MI
E 628		63.5	2.50	6	100	6	89	8	770	3	2.3	MJ	MJ	MI
E 638		60.6	4.25	8	100	8	88	5	835	3	2.0	MJ	MJ	MI
E 683		61.6	3.25	5	100	4	86	8	590	1	1.0	MJ	MJ	MI
E 702		62.6	4.75	8	100	7	87	5	850	4	3.0	MJ	MJ	MI
E 703		64.7	2.75	7	100	4	88	8	775	3	2.0	MJ	MJ	MI
E 705		63.3	3.25	7	100	4	87	7	765	3	2.3	MJ	MJ	MI
E 749		63.3	1.75	7	101	8	87	7	790	2	1.7	MJ	MJ	MI
E 750		63.5	2.25	5	99	4	86	8	655	1	1.0	MJ	MJ	MI
PH 983-69		64.3	4.75	8	101	8	88	5	790	4	2.7	MJ	MJ	MI
PH 984-75		62.2	4.75	8	100	8	88	1	815	3	2.0	MJ	MJ	MI

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)
MINOR FAULTING VALUES	57.9	41.4	8	13.9	6.8.3	.47	12.9	3	2,7,8	61.9	5.75-8.00
MAJOR FAULTING VALUES	56.9	38.4	18	12.9	66.3	.51	12.4	2	1,9-11	60.4	2.00-2.75 UNDER 1.75 OVER 8.00

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

## QUALITY DATA OF SPRING WHEAT SAMPLES 1987 CROP

TABLE 18 STATE-NEW YORK STATION-ITHACA NURSERY-FIELD PLOTS

VARIETY	SPD	TEST WT #'/BU	1000 G.	SIZING			WHT ASH %	HARD- NESS %	WHEAT SCORE K.F.K.	FLR EX%	ASH 65.6EX %	FLR PRO %	MILL CHAR %	MILL SCORE **	MIX ABS %	MIX PAT %
				WT	K.WT %	LG %										
MARSHALL	5	59.5	29.5	20	2	1.89	14.5	58	4	69.1	0.38	12.5	5	3	63.4	4
MILTON	59.1	40.6	76	2	1.79	13.4	54	3	69.0	0.38	14.5	5	2	63.2	4	
SINTON	50.5	32.4	43	1	1.78	15.4	66	4	64.5	0.42	13.5	5	2	64.2	4	
SIUUA	50	50.9	27.5	16	6	1.83	15.1	61	4	66.5	0.36	13.9	4	4	67.2	6
VERNON	59.4	36.2	72	1	1.79	12.7	62	2	69.1	0.39	14.0	5	2	61.3	6	
WHEATCH	57.9	33.9	40	9	1.75	14.2	59	4	68.6	0.40	12.8	5	3	66.3	7	
112 762139	59.1	32.4	42	3	1.77	15.4	65	4	66.5	0.39	13.9	4	4	66.0	4	
112 762157 725	59.9	30.6	52	2	1.75	14.2	60	4	64.2	0.45	12.6	5	1	64.2	5	
CORI	59.3	38.6	24	1	1.62	12.4	67	2	68.9	0.39	16.9	5	2	61.9	4	
LAUREL	53.5	31.6	41	3	1.71	14.2	69	4	67.5	0.40	15.1	4	4	67.3	6	

## QUALITY DATA OF SPRING WHEAT SAMPLES 1967 CROP

TABLE 18 (Cont.) STATE=NEW YORK STATION=ITHACA NURSERY=FIELD PLOTS

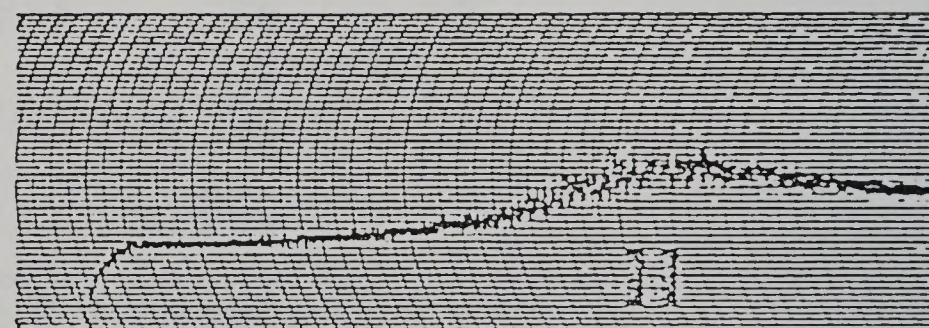
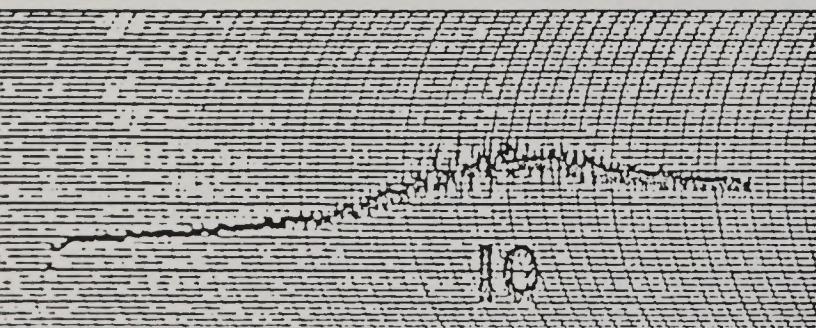
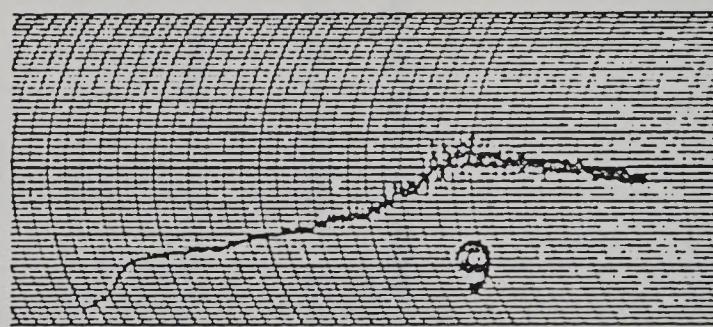
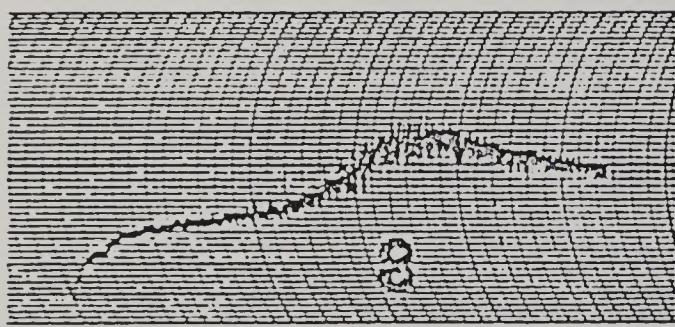
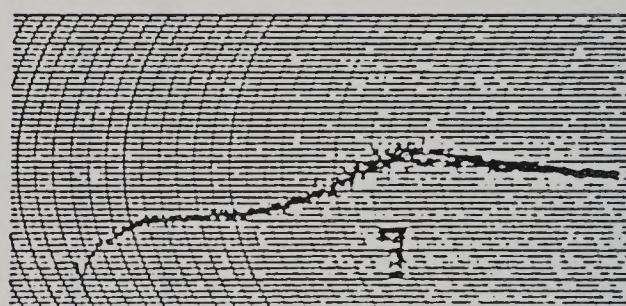
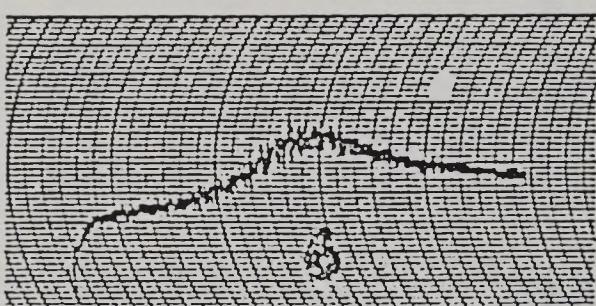
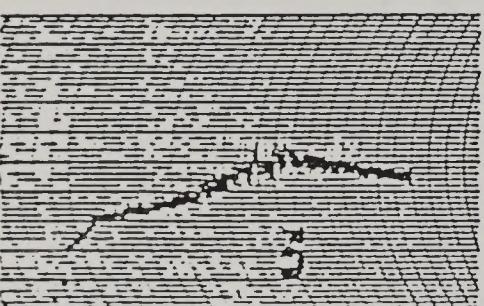
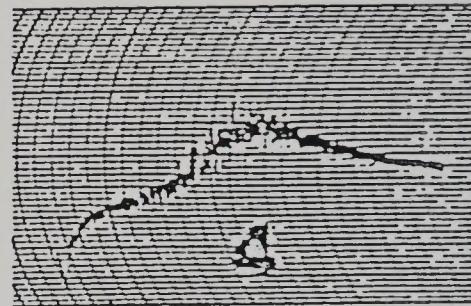
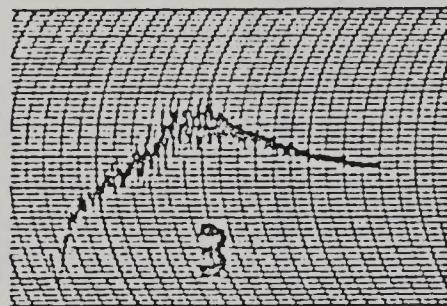
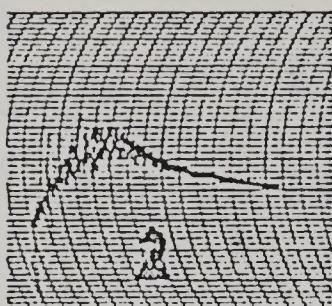
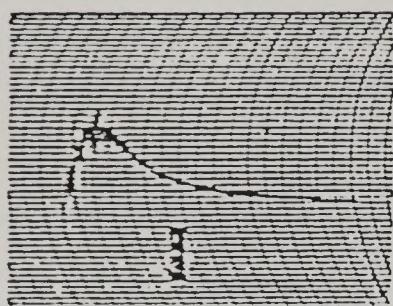
VARIETY	STD %	MIN	BAKE ABS %	MIX TIME CHAR MIN	DOUGH TIME CHAR MIN	CRUMB COLOR GRAIN	LOAF VOL CC	GENERAL SCORE ***	BAKE SCORE ***	DEFICIENCIES												
										TW	KW	SN	WP	EX	A65	FP	MC	MX	BA	DC	CC	CG
MARSHALL	8	64.7	3.75	7	100	6	86	3	795	3	3.3						MI	MJ				
MILTON	64.1	3.50	9	100	4	83	6	825	4	3.0							MI	MJ				
SANTON	65.9	3.50	8	100	7	89	6	860	4	3.3							MI	MJ				
STOA	66.4	4.50	8	100	7	88	6	890	4	4.0							MI	MJ				
VERNON	62.5	4.50	7	101	3	97	1	725	1	1.7							MI	MJ				
WEAVER	67.4	4.50	8	100	7	86	6	850	4	3.7							MI	MJ				
WS 734159	66.8	3.00	8	100	7	87	2	835	2	3.7							MI	MJ				
WS BRAND 715	65.3	3.00	6	100	7	82	4	780	2	2.3							MI	MJ				
ZEI 13	63.4	3.75	7	101	7	87	5	800	4	2.7							MI	MJ				
Z 6715	68.4	5.00	9	100	8	86	3	790	3	3.7							MI	MJ				

DEFICIENCIES TW KW SN WP EX A65 FP MC MX BA DC CC CG LV  
 NEWCASTLE VALUES 57.9 26.4 9 13.9 65.7 7.47 12.9 3 2,7,9 61.9 5,15 6,16 2,39+2,75 6 6 8 79.8  
 NEWCASTLE VALUES 56.9 25.3 8 12.9 65.7 7.51 12.4 2 1,9,11 60.4 5,15 6,16 3,75 4 5 4 75.

WEI 13 PROMISES LITTLE PROMISES A GOOD PROMISE.

# REFERENCE MIXOGRAMS

## HARD RED SPRING WHEAT



U.S.D.A. SPRING WHEAT QUALITY LABORATORY

FARGO, NORTH DAKOTA



